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Contents

Articles

Departments

Departments

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INDIA RUBBER WORLD

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Volume 95 **New York, November 1, 1936** **Number 2**

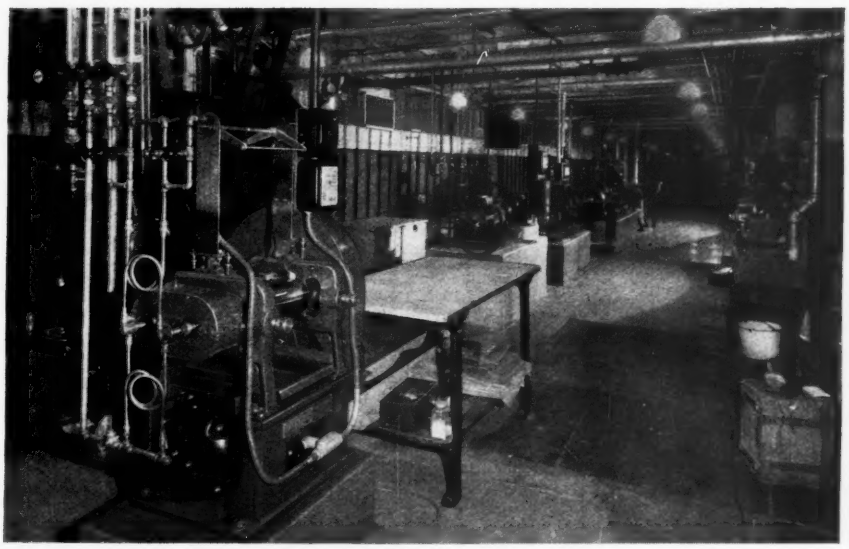
Rubber Research

A. R. Kemp [1]

IT IS now nearly a hundred years since Charles Goodyear discovered that plastic rubber could be made strong, elastic, and resistant to high and low temperatures through the process of mixing sulphur with it and heating the mixture for a few hours. This process is known as vulcanization and has made possible the development of the rubber industry as we know it today. Until a few years ago it was customary to add a large excess of sulphur to the rubber and to vulcanize it for hours. The resulting product was poor both in physical and aging properties. The development of organic accelerators and antioxidants which has taken place during the past fifteen years, for the most part by the tire industry, has changed all this.

Whereas Goodyear employed hours to vulcanize soft rubber, it is now possible to vulcanize completely in a fraction of a minute by the use of these high-speed accelerators. Rubber insulation is now being applied to wire and simultaneously vulcanized at speeds of several hundred feet per minute in the Western

[1] Insulation research chemist in charge of Organic Chemical Research Division, Bell Telephone Laboratories, Inc.



Rubber Compounding and Processing Department of the Bell Telephone Laboratories

A View of the Rubber Testing Laboratory

Electric continuous-vulcanizing process employed at its Baltimore factory for the manufacture of nearly all of the System's rubber-covered wire. This process not only makes more uniform wire, but results in many advantages as compared with the older process of coiling the wire on reels, or in pans filled with soapstone powder, and vulcanizing it in large autoclaves for periods ranging generally from one to five hours.

The compounding of rubber to meet the many and varied needs of today requires a very wide knowledge of materials. There are hundreds of different substances available for admixture with rubber, which serve to change its properties in the direction desired to meet factory process requirements and to make it perform satisfactorily under the numerous conditions and uses to which it is put. These materials may be grouped in accordance with the functions they perform. Crude rubber constitutes the body or continuous phase of the product. Reclaimed rubber is sometimes added to supplement crude rubber, to aid factory processing, and to reduce costs. Rubber substitutes, such as vulcanized vegetable oils, are added to produce special properties as in eraser stocks or to produce a velvety surface. To assist in plasticizing and softening rubber many different oils, asphalts, pitches, waxes, resins, and fatty acids are added. Hundreds of different fillers and pigments, organic and inorganic, such as whiting, barytes, clay, metallic oxides, organic dyes, and carbon black are available additions to aid factory processing and to produce varied colors. Many of these materials contribute toughness and hardness and reduce costs.

In addition to sulphur, selenium and tellurium are sometimes added as supplementary vulcanizing agents; and vulcanization is speeded up by the addition of accelerators. Rubber, free from corrosive sulphur, can be prepared by replacing the sulphur with a sulphur-bearing accelerator which releases active sulphur during vulcanization. Besides greatly shortening the time of cure, the addition of accelerators produces stronger and better aging rubber. Accelerator activators and retarders are added to control accelerator action. Antioxidants, which are synthetic organic chemicals, are added to reduce the tendency of the rubber to oxidize (age) in service with results of deterioration in its physical and electrical properties. The odor of rubber can be neutralized, or changed, by the addition of various reodorants, essential oils or perfumes. The approximate range of physical properties attainable in rubber compositions is illustrated in Figure 1.

No other material exhibits such a wide range of properties or has more diverse uses than rubber. Literally thousands of different articles are made from rubber or employ it in its various manufactured forms. In the telephone industry soft rubber finds its widest use as the insulation on the billions of feet of aerial and inside wires. Most important of these wires is the so-called drop wire or outside distributing wire, the annual production of which runs into many millions of feet. Much improvement, as indicated in Figure 2, has been brought about in the quality of the insulation on this wire during the past few years. Similar improvements have been effected in other types of wire leading to considerable immediate and prospective savings.

Rubber insulation in varied colors has recently been developed as a substitute for the textile insulation of tinsel conductors in cords, with a resulting large improvement in their moisture resistance. It is now possible, by the use of extremely small amounts of sulphur for vulcanization, to insulate tinsel conductors without the rubber compound's having the corrosive effect on the tinsel which was unavoidable with the old types of rubber compound. This has also resulted in a decided improvement in the physical and aging characteristics of the insulation as shown in Figure 3.

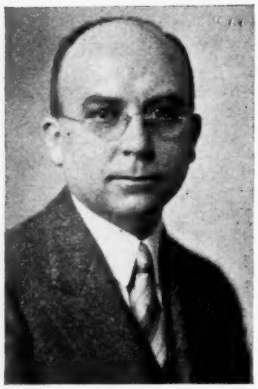
Soft rubber finds many other important uses in the Bell System in the form of molded parts, insulating tapes, electricians' gloves, and other items. Hard rubber also serves many important insulating functions because of its excellent dielectric properties; and is an important item of manufacture. Recently an improved hard rubber has been developed for use as the disk insulation in coaxial cables. The improvement in the quality of rubber for these and other varied uses is constantly receiving attention in our laboratories.

About 15 years ago Bell Laboratories, then the Engineering Department of the Western Electric Co., undertook extensive researches in the field of submarine insulation. New methods of purifying and of compounding rubber and gutta percha were developed. These resulted in great improvement in the electrical properties and water resistance of these materials. One result of this work was the development of the thermo-plastic insulation called paragutta.[2]

Paragutta has a dielectric constant of 2.6 and a power factor of 0.1% as compared with values of 3.3 and 1.5% respectively for gutta percha, when measured at 2,000 cycles and 25° C. The superiority of paragutta is even greater for sea-bottom conditions. This dielectric superiority of paragutta over

[2] *Bell Lab. Record*, May, 1931, p. 422. India Rubber World, June 1, 1931, pp. 56-57.

A. R. Kemp



THE author of this article, Archie Reed Kemp, insulation research chemist in charge of the Organic Chemical Research Division, Bell Telephone Laboratories, Inc., 463 West St., New York, N. Y., needs little introduction among the rubber technologists of the United States. Mr. Kemp is a product of the West, having been born on a farm near Groton, S. D., April 24, 1894. The family moved to Pasadena, Calif., in 1907 where he attended public school and later the California Institute of Technology. Here he majored in chemistry, receiving his B.S. degree in 1917, and in 1918 served as a teaching fellow and obtained his M.S. degree. During this period his practical experience also began with his association as chemist of the General Petroleum Co. Following graduation Mr. Kemp joined the Bell Telephone Laboratories, then the Western Electric Engineering Department. Since 1920 he has given attention mainly to chemical research on rubber and allied materials as related to insulations. He has produced numerous patents in the field of submarine cables and rubber covered wire, including the invention of a deproteinized rubber composition, paragutta, which has made possible the manufacture and practical utilization of long high-frequency multi-channel submarine telephone cables.

Mr. Kemp has written many papers in the field of organic chemistry as well as in that of rubber. Mr. Kemp served as chairman of the New York Group, Rubber Division, American Chemical Society, in 1933 and was recently elected vice chairman of the division for 1937. He belongs also to Sigma Alpha Pi, and F.&A.M. He resides at 170 Lexington Ave., Westwood, N. J.

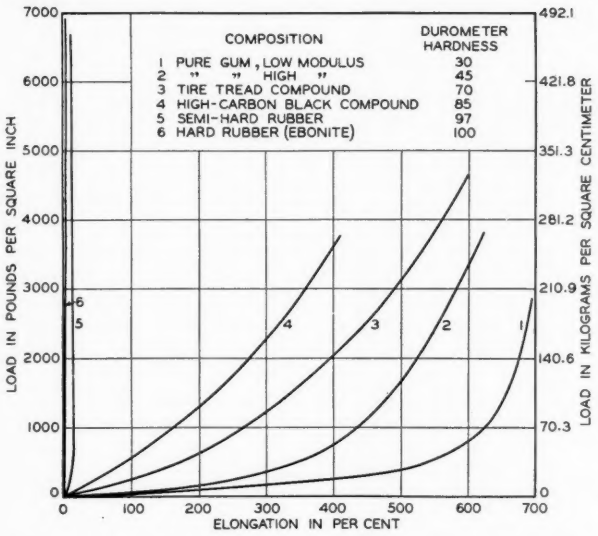


Fig. 1. The Range of Stress-Strain Characteristics Obtainable with Various Rubber Compounds

ordinary gutta percha has been an important factor in the recent construction of long, high-frequency multi-channel submarine telephone cables, such as the ones between Key West and Havana, Hakkaido and Sagaien, and the recently installed Australian-Tasmanian cable.

Soft vulcanized rubber can also be made electrically stable when immersed in water as shown in Figure 4. This is accomplished by employing crude rubber that has been freed by chemical treatment from proteins, sugars, salts, and other water absorbing impurities. Besides its use for submarine cables, this stable vulcanized rubber seems very likely to prove valuable as the insulation of wires that are installed in wet places either underground or in building ducts.

Crude rubber, which now comes almost entirely from plantations in the Far East, is a complicated mixture, and varies somewhat in composition and characteristics due to natural causes. These variations may be reflected adversely in the final product unless steps are taken to avoid them. Its main constituent is a highly polymeric, unsaturated hydrocarbon, having a molecular composition of C_5H_8, and containing what has variously been estimated as more than a thousand of these groups in a long chain structure. The hydrocarbon is present in the best plantation rubber to the extent of about 93%. It is this hydrocarbon which combines chemically with ½ to 4% sulphur to produce soft vulcanized rubber, and with 25 to 32% sulphur to produce hard rubber as a result of the vulcanization process. The other main ingredients are resin and protein. The resin fraction contains many substances such as fatty acids, sterols, sterol esters, amino acids, and sugars.

Many engineers are still skeptical regarding the life of rubber goods. This is because rubber articles are still being sold which age poorly. It should be remembered, however, that the improvement which has been made in the quality of rubber during the past few years is only reflected in an article of manufacture when proper steps are taken in its fabrication. The purchaser can insure that these steps will be taken by employing suitable specifications.

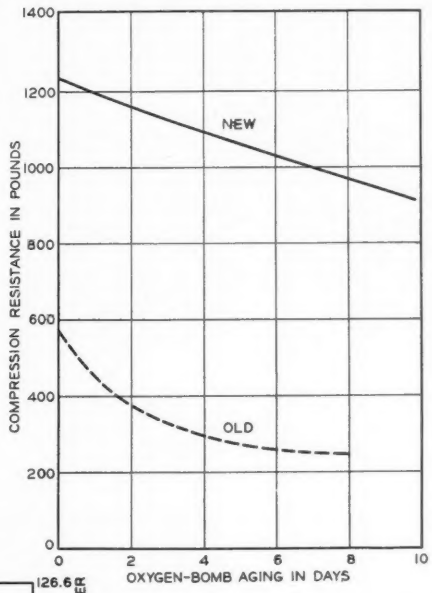


Fig. 2. Improvements in Drop-Wire Insulation Brought about by Rubber Research

Since the Bell System manufactures most of its rubber requirements, control is exercised both through compounding and performance tests. Well equipped laboratories are maintained for the mixing and testing of rubber compounds and for the production of samples for test purposes. The staff endeavors to keep fully informed of the varied developments occurring in kindred industries, and to adapt them to special Bell System needs. A very wide range of chemical, physical, and electrical tests is employed to evaluate rubber products and those requiring special types of testing equipment. Work on rubber insulation for wire is under the supervision of J. H. Ingmanson;

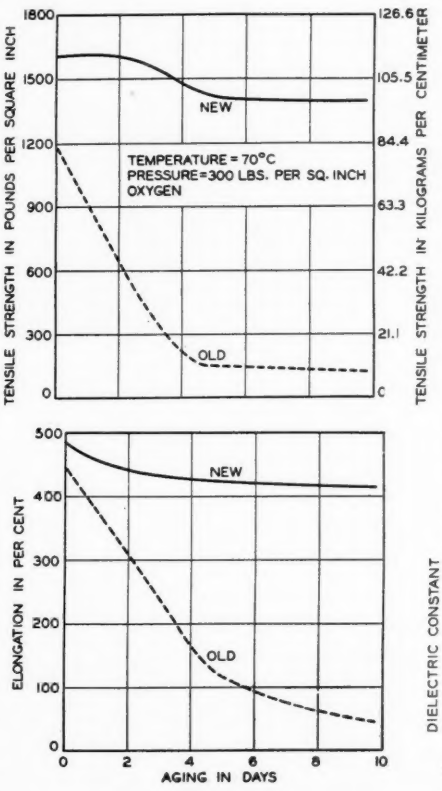


Fig. 3. Improvement in Physical and Aging Characteristics of the Rubber Insulation of Tinsel Conductors

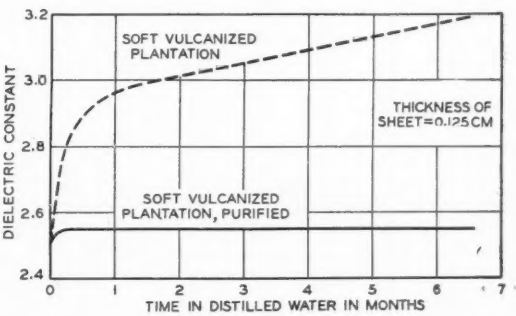


Fig. 4. Effect of the Purification of Rubber on Its Electrical Stability in Water

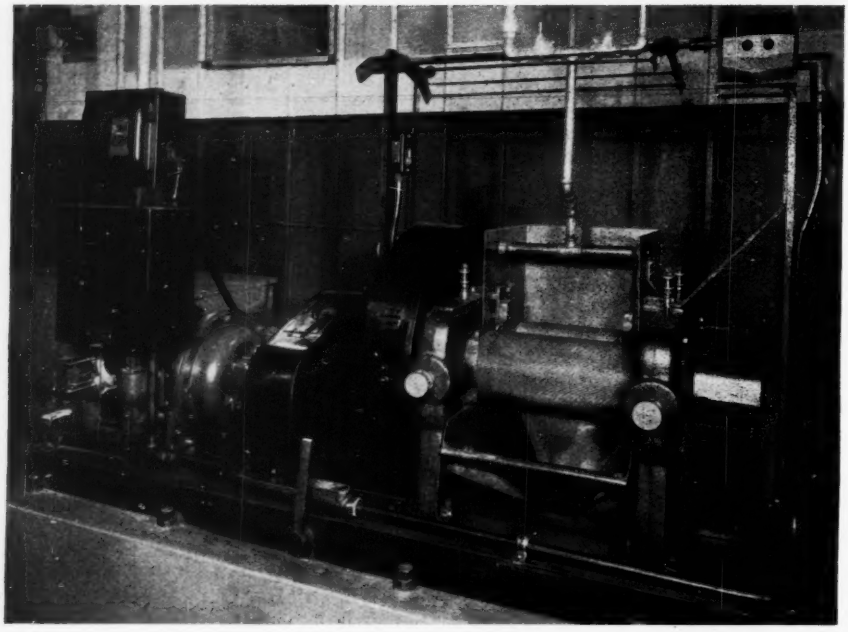


Fig. 5. A "Washer" in the Rubber Research Laboratory. On This Machine the Crude Rubber Is Thoroughly Washed before It Is Ready for Compounding

while the work connected with other applications of rubber is supervised by F. S. Malm.

Along with the development of new rubber compositions for Bell System use, has come the development of better testing procedures. The compression machine[3] for factory and laboratory testing of wire has proven valuable in connection with the whole program. Rubber has also been made recently for use in telephone apparatus which is very resistant to heating in air as shown in Figure 7. Accelerated aging tests, such as the Bierer and Davis test, in which rubber is heated under oxygen pressure, have been very valuable in predicting the life of rubber in service.

Rubber exposed to light while under strain is likely to crack rather rapidly. This is one of the problems for future solution. In the absence of direct sunlight under normal conditions, however, rubber is now being manufactured to last twenty years or longer. These results are accomplished by employing scientific compounding and suitable testing procedures for controlling the product. Synthetic rubber-like materials such as polychloroprene ("DuPrene"[4]) and olefin polysulphides (Thiokols) are now commercially available. These products are more resistant to light, ozone, and oil than is rubber. They are finding uses in various applications where the need is sufficient to justify their higher cost.

Thousands of rubber compounds have been prepared and tested in our research laboratories; and the effects of various treatments and additive materials on the aging, physical, electrical, and moisture-absorption properties of these compositions have been determined. As a result of this work, much information has been accumulated which is constantly being applied to improving and extending the use of rubber throughout the Bell Telephone System.

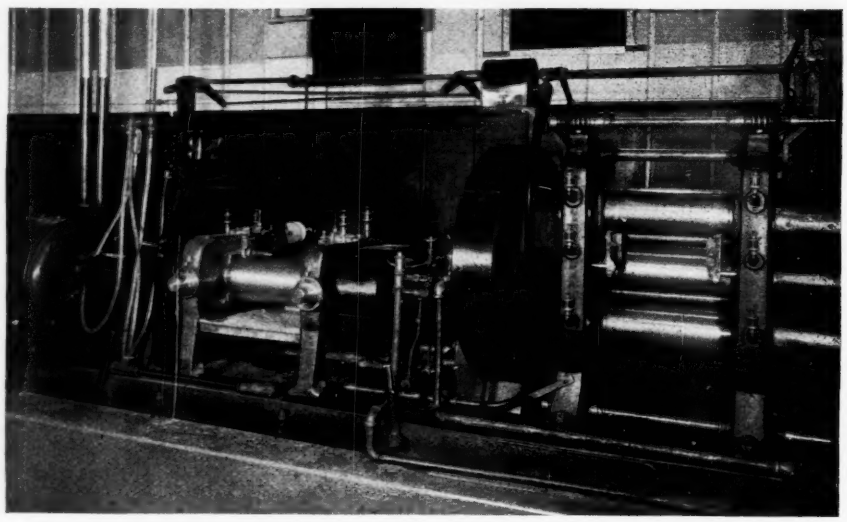


Fig. 6. Warming-up Mill and Calender Used for Rolling Rubber Sheet

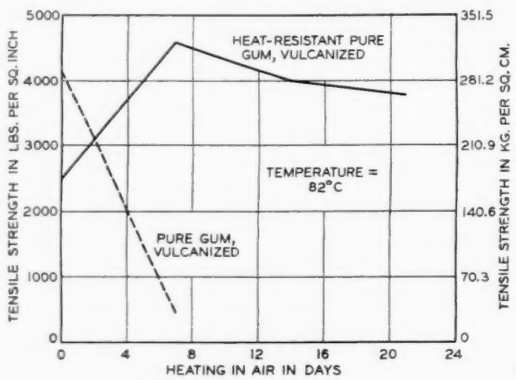


Fig. 7. Effect on Tensile Strength of Heating Rubber in Air at 82° C.

[3] *Bell Lab. Record*, Jan., 1928, p. 153.
[4] Trade mark registered.

Carbon Black Increases in Texas

Production of carbon black outside the Texas Panhandle decreased slightly in '35, hence the center of the industry moved nearer the Texas Panhandle. The output in Louisiana declined from 66,538,000 pounds in '34 to 64,875,000 pounds in '35. Production in the Texas Panhandle rose to a new record of 263,361,000 pounds, an increase of 11% over '34.

Rubber Tire Industry Trade Practice Rules

TRADE practice rules for the rubber tire industry were promulgated October 17 by the Federal Trade Commission, Washington, D. C., under its trade practice conference procedure.

A general conference for that industry was held under the auspices of the commission at Chicago, June 4, last. Hon. Commissioner Robert E. Freer presided, assisted by George McCorkle, director, and Henry Miller, assistant director, of the commission's trade practice conference division.

At that conference proposed rules were submitted by the industry to the commission for its approval. The proposed rules were then tentatively passed upon by the commission and released for a 15-day opportunity for all interested or affected parties to present any suggestions or objections to the proposed rules. Subsequently some amendments were adopted, and upon full consideration the rules as amended were approved as to Group I, and as to Group II were received by the commission as an expression by the industry.

The rubber tire industry embraces the manufacturers of automotive tires and tubes and all distributing units and trade outlets. According to information furnished the commission, the manufacturers number about 50 companies and the distributing units and trade outlets exceed 100,000. The total capital investment of the industry is said to approximate $2,000,000,000, and the aggregate annual volume of business is about $750,000,000.

These rules promulgated by the commission are designed to foster and promote fair competitive conditions in the interest of industry and the public. They are not to be used, directly or indirectly, as part of or in connection with any combination or agreement to fix prices, or for the suppression of competition, or otherwise to unreasonably restrain trade.

GROUP I

The unfair trade practices which are embraced in Group I rules are considered to be unfair methods of competition or other illegal practices within the statutes and the decisions of the Federal Trade Commission and the courts; and appropriate proceedings in the public interest will be taken by the commission to prevent the use of such unlawful practices in or directly affecting interstate commerce.

Rule 1

(a) *Prohibited Discriminatory Differentials, Rebates, Refunds, Discounts, Credits, and Other Allowances.* It is an unfair trade practice for any member of the industry engaged in commerce[1], in the course of such commerce, to grant or allow, secretly or openly, directly or indirectly, any price differentials, rebates, refunds, discounts, credits, or other allowances which effectuate a discrimination in price between different purchasers of goods of like grade and quality where either or any of the purchases involved therein are in commerce and where the effect thereof may be substantially to lessen competition or tend to create a monopoly in any line of commerce or to injure, destroy or prevent competition with any person who either grants or knowingly receives the benefit of such discrimination or with customers of either of them, *provided, however*

(1) That the goods involved in any such transaction are sold for use, consumption, or resale within any place under the jurisdiction of the United States;

(2) That nothing herein contained shall prevent differentials which make only due allowance for differences in the cost of manufacture, sale, or delivery resulting from the differing methods or quantities in which such commodities are to such purchasers sold or delivered;

(3) That nothing herein contained shall prevent persons engaged in selling goods, wares, or merchandise in commerce from selecting their own customers in bona fide transactions and not in restraint of trade;

(4) That nothing herein contained shall prevent price changes from time to time where made in response to changing conditions affecting either (a) the market for the goods concerned, or (b) the marketability of the goods, such as, but not limited to, actual or imminent deterioration of perishable goods, obsolescence of seasonal goods, distress sales under court process, or sales in good faith in discontinuance of business in the goods concerned.

(b) *Prohibited Brokerages and Commissions.* It is an unfair trade practice for any member of the industry engaged in commerce in the course of such commerce to pay or grant, receive or accept anything of value as a commission, brokerage, or other compensation, or any allowance or discount in lieu thereof, except for services rendered in connection with the sale or purchase of goods, wares, or merchandise, either to the other party to such transaction or to an agent, representative, or other intermediary therein where such intermediary is acting in fact for or in behalf, or is subject to the direct or indirect control, of any party to such transaction other than the person by whom such compensation is so granted or paid.

(c) *Prohibited Advertising or Promotional Allowances, Etc.* It is an unfair trade practice for any member of the industry engaged in commerce to pay or contract for the payment of advertising or promotion allowances or any other thing of value to or for the benefit of a customer of such member in the course of such commerce as compensation or in consideration for any services or facilities furnished by or through such customer in connection with the processing, handling, sale, or offering for sale of any products or commodities manufactured, sold, or offered for sale by such member, unless such payment or consideration is available on proportionally equal terms to all other customers competing in the distribution of such products or commodities.

(d) *Prohibited Discriminatory Services or Facilities.*

[1] As herein used, the word "commerce" means trade or commerce among the several states and with foreign nations, or between the District of Columbia or any territory of the United States and any state, territory, or foreign nation, or between any insular possessions or other places under the jurisdiction of the United States, or between any such possession or place and any state or territory of the United States or the District of Columbia or any foreign nation, or within the District of Columbia or any territory or any insular possession or other place under the jurisdiction of the United States; provided, that this shall not apply to the Philippine Islands.

It is an unfair trade practice for any member of the industry engaged in commerce to discriminate in favor of one purchaser against another purchaser or purchasers of a commodity bought for resale, with or without processing, by contracting to furnish or by furnishing, or by contributing to the furnishing of, any services or facilities connected with the proceeding, handling, sale, or offering for sale of such commodity so purchased upon terms not accorded to all purchasers on proportionally equal terms.

(e) *Illegal Price Discrimination.* It is an unfair trade practice for any member of the industry or other person engaged in commerce in the course of such commerce to discriminate in price in any other respect contrary to Section 2 of the Clayton Act as amended by the Act of Congress, approved June 16, 1936 (Public No. 692, 74th Congress), or knowingly to induce or receive a discrimination in price which is prohibited by such section as amended.

Rule 2

The defamation of competitors by falsely imputing to them dishonorable conduct, inability to perform contracts, questionable credit standing, or by other false representations, or the false disparagement of the grade, quality, or manufacture of the products of competitors or of their business methods, selling prices, values, credit terms, policies, or services, with the tendency, capacity, or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 3

The practice of selling goods below the seller's cost, with the intent and with the effect of injuring a competitor and where the effect may be to lessen competition substantially or tend to create a monopoly or unreasonably restrain trade, is an unfair trade practice; all elements recognized by good accounting practice as proper elements of such cost shall be included in determining cost under this rule.

Rule 4

The making or causing or permitting to be made or published any false, untrue, or deceptive statement, representation, guarantee, warranty or adjustment policy, by way of advertisement or otherwise, concerning the grade, quality, quantity, substance, use, character, nature, origin, size, manufacture, or distribution of any product of the industry or concerning the life or service of tires or tubes, or in any other material respect, having the tendency, capacity, or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 5

The false or deceptive marking or branding of products of the industry for the purpose or with the tendency, capacity, or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public with respect to the grade, quality, quantity, use, size, material, content, origin, preparation, manufacture, or distribution of such products, or in any other material respect, is an unfair trade practice.

Rule 6

For any person, firm, or corporation to hold himself or itself out to the public as "an authorized dealer" when such is not the fact, or for any member of the industry to misrepresent the character of his business, with the tendency, capacity, or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 7

For any member of the industry to represent, by advertising or otherwise, that he handles "all standard makes" of tires or tubes, when such is not the fact, with the tendency, capacity, or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 8

Falsely representing in the sale or offering for sale of "change over" tires or tubes that such tires or tubes are new or unused when they are in fact not new or unused, with the tendency, capacity, or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 9

Withholding from or inserting in the invoice or sale ticket statements which make the invoice or sale ticket a false record, wholly or in part, of the transaction represented on the face thereof, with the purpose or effect of thereby misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 10

(a) The passing off, selling, or offering for sale of used, rebuilt, recapped, retreaded, or repaired tires as new or unused tires, is an unfair trade practice.

(b) The sale or offering for sale of used, rebuilt, recapped, retreaded, or repaired tires which have been dressed or prepared so as to simulate new or unused tires without having durably and conspicuously branded or molded in the rubber thereof the word "SECOND-HAND," or the words "USED TIRE—REBUILT," "USED TIRE—RECAPPED," "USED TIRE—RETREADED," or "USED TIRE—REPAIRED," as the case may be, or without otherwise fully and truthfully disclosing to all purchasers and users the fact that such tires are not new, but in truth are second-hand tires, or used tires which have been rebuilt, recapped, retreaded, or repaired, respectively, with the purpose or with the effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, or with the purpose or effect of placing an instrument of fraud or deception in the hands of dealers or in other channels of trade, is an unfair trade practice.

Rule 11

The direct or indirect misrepresentation of tires as being of a quality or grade higher than in fact they are, or as being of first, second, third, fourth, or fifth line or grade when such is not the fact, having the tendency, capacity, or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Rule 12

The use in advertisements of illustrations or depictions of tires or tubes of a different brand, style, or size, or of a higher line, grade, or quality than the tires or tubes to which the representations in such advertisements are truthfully applicable, having the capacity, tendency, or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

(*Continued on page* 48)

Rubber: the Coming Boom

R. H. Wright

IS HISTORY going to repeat itself? Are we to witness another boom in the plantation industry? At first glance such a supposition would appear absurd, with restriction of output in force and the selling price as low as it is. Yet to the practical planter—the man who produces the commodity—the writing on the wall is clear. Let me translate that writing through spectacles that have witnessed the two previous booms.

Firstly, as every planter knows, the potential output of the estates has been seriously overestimated. The basic quotas, or exportable allowances, granted to the various producing countries by the International Rubber Regulation Committee are 25% too high; if restriction on output were to be removed tomorrow and every tree tapped, the producing countries could not ship by thousands of tons the amounts they have been estimated to yield.

This assertion is easily proved. When restriction of output was first introduced in June, 1934, the exportable allowance of the allotted quotas was fixed at 100% for the first two months (June and July); the average for the completed year (June to December, 1934) worked out at 87½%. Yet in those seven months British Malaya, by far the largest producing country in the world, failed to ship its permissible allowance of 256,200 tons by 12,229 tons, and there is little doubt that the estates strained every nerve to produce to the fullest capacity permitted. In the case of the Dutch East Indies, the second highest producing territory, over the same period the rubber shipped amounted to little more than the exportable allowance, 1,509 tons of a surplus. It is well known, however, that this excess was accounted for by the release of long-stored native rubber, the European-owned estates showing a deficiency of 6,800 tons over this period.

During the first quarter of 1935, when the exportable allowance remained constant at 75% of the allotted quotas, British Malaya shipped only 87,532 tons out of 100,876 granted (excluding the carry-over from 1934 of 12,229), a deficiency of 13,344 tons. The *total* Dutch exports over the same period showed a deficiency of 5,982 tons. For the remainder of 1935 and to date in 1936 comparisons of production and export cannot be considered as during that time the exportable allowances have varied between 60% and 70% of the basic quotas.

Next consider stocks, the accumulation of which has caused the slump in the industry. At the end of 1934 in the United States stocks amounted to 355,000 tons; while those in Great Britain stood at 134,927. But with the return of better business in America, stocks are being greatly reduced, the figures at the end of August being 229,056; while those in Great Britain have been falling with monotonous regularity for months past, standing at the time of writing at about 108,000 tons. It is due mainly to the better demand for the commodity following the many new uses discovered for it, combined with returning world trade, that the rubber industry is getting on its feet again. There is little doubt that rubber is destined to play an increasingly greater part in the manufactories of the world as the months and years pass; with stocks falling steadily it can only be a question of time before the producing countries will be exporting to capacity again. But that capacity, writing as a planter, I do not believe will attain to more than 75% of their basic quotas.

Which prompts the compelling question: What is going to happen *then?* If the world demand for rubber keeps on increasing, as everything points to its doing, where are those extra thousands of tons of rubber coming from? It is to be remembered that new planting, except in nominal areas for research and experimental purposes and for the replacement of wornout trees, has been prohibited during the initial five-year plan of restriction, that is from June, 1934, to the end of 1938. But in British Malaya all planting ceased by governmental order some years earlier. Now the rubber tree does not reach the economic yielding stage until it is six years old, attaining full production at ten. This means that very little in the way of increase in production can be expected from British Malaya at the end of 1938; while even if thousands of acres were to be planted during 1939, the crop from such areas would not come on the market before 1945, reaching full production four years later.

As for the Dutch, judging from the incidence of their quota awards, they do not expect to increase their output much after 1938, for 1937 and 1938 their awarded increases have been fixed at only 20,000 tons in each case; and every planter knows that the Dutch had nothing to complain of in the matter of quota allowances.

Then how is the manufacturer going to get that extra rubber he will be looking for—with the two main producing countries unable to increase their output? I wonder—and so in due course will he!

I am aware that remarkably high yields have been obtained from budgrafted trees. Also that the practice of cutting down a certain acreage per year of the older plantings and replanting with "budded" "stumps" or selected seedlings has become part of the program of many of the estates. But even so, and should the practice become general, this cannot be expected to meet the shortage, much less bridge the gap between 1939 and 1945. For one thing, those trees, budded or not, have to grow to the producing stage; and for another, it has yet to be proved that a 3,000- or 5,000-acre estate of budded rubber will produce at the same high rate as an area of, say, 100 acres planted on specially selected soil and heavily manured during growth.

I have no wish to swell the ranks of the prophets, but, as I have said, the writing on the wall is there for anyone to read. History *is* going to repeat itself: another boom in rubber is coming—and the time of its coming may be at the end of 1939 or during 1940.

CARBON BLACK PRODUCTION IN THE UNITED STATES during 1935 was 352,749,000 pounds as against previous highs of 366,442,000 pounds in 1929 and 379,924,000 in 1930, according to a recent report of the Bureau of Mines. Demand reached a new peak with total sales at 387,536,000 pounds, 245,351,000 for domestic buyers and 142,185,000 for export trade.

Getting Ahead of the Weather[1]

Some Modern Methods for Long-Range Weather Forecasting

Mason T. Rogers[2]

RIGHT now, as you read this article, you may be wondering whether it's going to rain next week; so you can't play in that golf tournament—or if the weather will be good during your vacation. If you're a citrus farm operator, you may be wondering whether you should get your smudge pots ready for a coming cold snap. If you're a can-maker, it may be whether you should work the can-shop over the week-end piling up inventory, or if the drought is going to continue so that you've already got more cans in warehouses than you'll sell this season. Or if you manage an airport, whether it's safe to permit a transatlantic flyer to start. All of us, in private life and in business, are mightily affected by the weather and interested in knowing what it's going to be before it happens.

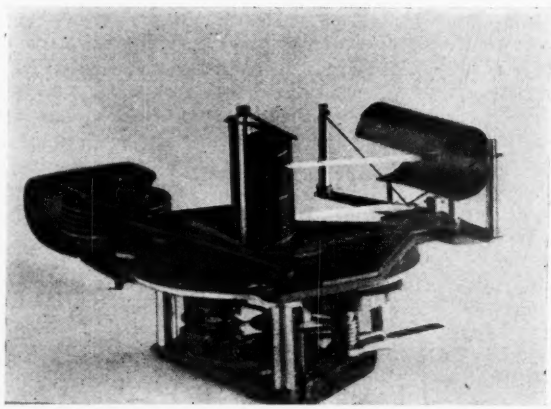
In fact, we've built up all sorts of systems of weather prognostications, from the movements of wild animals and the caprices of our corns, relied on by local weather prophets, to the scientific study of sun-spots and the statistics of past weather cycles. Our government has established highly organized weather bureaus that have been recording and studying meteorological data over several decades.[3] Accurate and careful as these reports are, today we need even better information. And to get this, meteorologists have gone to the research laboratories of both pure and applied science—have applied the most recent developments in radio, navigation, chemical and physical research. For accurate long-range weather forecasts have a very definite national value.

The farmer, the canner, the can-maker, and anyone engaged in the food industries is obviously directly and vitally concerned with changing climatic conditions that influence the food crop. It was natural therefore that, as suppliers to the canning industry, Dewey & Almy Chemical Co. should apply their knowledge and extensive research work in the handling of rubber latex to the development of better and cheaper means of exploring and studying the upper air masses. For it is the belief of scientists that a practical means for getting regular knowledge of conditions in the upper air regions and into the stratosphere will lead to valuable knowledge necessary for long-range weather forecasting.

It was relatively only a few years ago that the only method of gathering information on the upper air conditions was by captive balloons or kites. From 1894 on kites were used quite extensively by observatories throughout the country in collecting data on weather in the upper air; and large power-driven reels and reel-houses moving on circular tracks were developed to feed out the miles of steel wire to the ascending kites. The work was much hampered, however, by the fragile nature of the kites, which made manipulation often difficult and sometimes dangerous and frequently resulted in the loss or destruction of the kites just when information would have been most important, as during electrical storms or when the atmosphere glazed the kites with ice.

About the close of the World War the Weather Bureau began using airplanes to gather vital weather data. This offered a more flexible means of obtaining information than did the kites, but this method also had its limitations, both in the heights to which the plane could climb and because once more it was impossible to obtain information during inclement weather, just when it was most

Early Type Radio-Meteorograph—Bronze Antenna Wire in Foreground



Radio-Meteorograph without Housing or Radio Transmitter

[1] Reprinted from *Canning Age*, Aug., 1936.
[2] Head of sales research, Dewey & Almy Chemical Co., Cambridge B, Mass.
[3] This work is being greatly augmented by the meteorological research being carried on by such institutions as Harvard, Massachusetts Institute of Technology, the Bartol Foundation, etc., and also by such scientists as Doctors Compton, Millikan, Brooks, Johnson, Rossby, Thomson, O'Brien, and others.

needed. For to date aviation is still grounded in hurricane weather.

Previously some work had been done with free balloons, using recording instruments which, when the balloon broke, descended to earth guided by a parachute. But this was expensive and inefficient because the recovery of the instruments and their precious records was entirely a matter of chance. In the case of seaboard stations, particularly, the instruments were generally carried to sea and lost, and even in the interior of the country, where the chances of recovery ran much higher, there was often a considerable lapse of time between the recording and the recovery of the instrument.

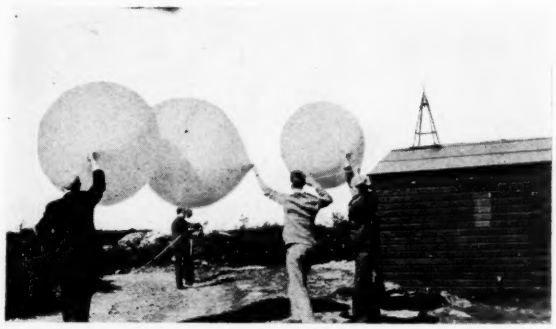
The recording instruments were heavy and expensive. Their rate of ascension was slow. Attempts toward increasing the rate of ascension by larger balloons or balloons in groups brought about a tremendous increase in cost. The high cost led to the practical abandonment for the time being of free balloons in favor of work with airplanes.

Radio Offers New Possibilities

With the rapid development of radio, new possibilities for gathering information were opened up. If small transmitting radios could be sent into the upper air regions, it would be possible to get immediate reports on vital weather conditions. No longer were bulky, heavy recording instruments necessary. Now effort was concentrated on building accurate lightweight instruments. The first rough radio barographs were strapped to the wings of airplanes, and successfully transmitted their observations to the ground receiving station.

Careful work by Dr. Karl O. Lange and Arthur E. Bent, research associates at the Blue Hill Meteorological Observatory of Harvard University, resulted in the building of lightweight radio-meteorographs of high accuracy built on the Olland principle. Under the active guidance of Mr. Willis R. Gregg, chief of the United States Weather Bureau, similar work has been done in Washington, using the radio-meteorograph developed by Dr. L. F. Curtis. It is predicted that these instruments can be built on a production basis at a cost that will permit their use for daily observation at the 25 or 30 government stations already established throughout the country.

Showing Wind Stresses on Stratosphere Balloons



Launching a Flight—Man in Background Holds Radio-Meteorograph Which Balloons Will Pick Up after Being Released

But, even with the development of lightweight instruments, some new kind of lifting device was required that would get the instruments into the air in all kinds of weather. Existing balloons were too expensive. Attempts toward increasing the rate of ascension of the balloons brought about tremendous increase in cost and difficulty in launching. At this point the Dewey & Almy research laboratories were able to apply their knowledge and experience with rubber latex to the development of more suitable balloons in larger sizes capable of greater lift and speed, at a cost that permitted their practical use. The balloons now made are in diameters of four and six feet uninflated and have been inflated to diameters of 14 feet and 25 feet without breaking. This makes possible radio soundings at heights in excess of 20 miles, with a rate of ascent of 1,000 feet per minute. With the facilities for stratosphere observations which these new balloons and new instruments make possible, and with the highly organized system of meteorological stations already existing over the whole country, it is hoped that in the not distant future long-range weather forecasts may become a reality.

The Radio-Meteorograph

The essential parts of the Harvard radio-meteorograph consist of clockwork, meteorological instruments (barometer, thermometer, and hygrometer), and the control system. The works of dollar watches rotate a contact cylinder on which is wound a fine silver wire in helix form. The arms of the instruments giving pressure, temperature, and humidity are arranged to contact the cylinder at 90 degrees from one another, and there is a reference contact in the fourth quadrant. As the contact cylinder rotates, it sends a radio signal each time it crosses one of the arms of the instrument. These signals are received at the ground and amplified with an apparatus developed for that purpose. The contacts of the radio transmitter are recorded on a paper-covered drum by a pen actuated by the amplifier and a relay. It is easy to see that, having a regular reference signal once each minute, with the meteorological signals varying in time in relation to the position of the instrument arm, it is possible to build a record of the temperature and relative humidity at the different heights, which are indicated by the pressure. The meteorological instruments consist of an aneroid barometer to give pressure, a sensitive bi-metallic strip to give temperature, and a hair hygrometer for measuring relative humidity.

The launching of the balloons and instruments is no easy task, as wind currents make the thin balloons rather unruly creatures. The balloons are sent up singly or in clusters, depending upon the lift required to carry the instruments. In the case of single balloons, parachutes must be incorporated in the unit to temper the fall of the instruments after the increasing rarity of the atmosphere causes the balloon to burst. When clusters of two or more balloons are used no parachute is necessary, because when one balloon breaks the dead weight becomes greater than the lift, and the remaining balloons themselves act as parachutes to prevent too precipitous a fall.

Although rubber snubbers are used between the balloons and instruments to dampen surges, care in releasing the balloons is necessary to prevent snapping the cords.

A better picture of the difficulties encountered in sending off balloon flights can be seen from the accompanying photographs taken at the Blue Hill Observatory. Notice the stresses on the balloons in only a 20-mile wind.

On this particular trial the radio signals were followed for three hours and seven minutes. The top, approximately 20 miles, was reached in two hours, and the signals were then followed for more than an hour of the descent before they faded out.

It is obvious that for greater usefulness a launching device is necessary. Such a tool is now being developed by the Dewey & Almy Co., consisting of a five-foot steel tube set at about a 60-degree angle which can be rotated into the wind to take care of varying wind deviations.

These new sounding balloons are made under the Kaysam process—a newly patented method of casting latex in gel form.[4] By suitably modifying this process, balloons are built which, uninflated, have a diameter of four or six feet. These balloons have the capacity to expand to more than four times their diameter before the elastic limit of the rubber is reached and the rubber molecules can no longer hold together and the balloons burst. It is this very important feature that makes them valuable for this meteorological work.

In use the balloons are filled with hydrogen so that there are only a few millimeters of pressure inside. From facts already known it is possible to compute the lifting rate of this volume of gas. As the balloon rises into the upper air levels, it encounters air at a reduced pressure. This difference of pressure inside and outside the balloon is immediately compensated for by the expansion of the balloon. As the balloon expands in size, its new buoyancy offsets the reduced pressure so as to give a uniform rate of ascension. This expansion continues until the latex rubber has no more stretch and so bursts.

Possibilities in Future Studies

These new large-size yet inexpensive balloons are opening new fields for study. Scientists are planning numerous flights to get more accurate information to apply both to the immediate benefit of mankind and to the advancement of pure science. According to Professor Charles F. Brooks, of Harvard University, director of the Blue Hill Observatory, these studies of the upper air regions will yield valuable information such as:

(1) Observation of the sun and its output of energy.

(2) Observation of the intensity of the ultra-violet rays in sunlight to learn of the variations in the Ozone layer, which is mostly from 10 to 50 miles high.

(3) Cosmic ray studies.

(4) Long-range weather forecasting from slow shifts of large masses of air in the stratosphere.

(5) More accurate daily weather forecasting from improved atmospheric sections for the new air-mass analysis method of forecasting. Knowledge of the overlapping of different masses, such as tropical gulf above polar continental, shows what processes are about to take place in the storm levels whence our rain and snow come.

(6) Aviation will be benefited by the new knowledge of winds at various levels, even well up in the stratosphere. For the radio meteorograph, with direction finders trained upon it, will reveal the positions of the balloon continuously, whether or not clouds are present to shut it from view. Our present knowledge of upper winds is based on observations of balloon movements in clear weather or of high clouds visible only when lower clouds are broken or absent. Thus the stormy weather is largely unrepresented.

(7) Hurricane studies. With property losses from wind-storms running up to $102,000,000 in a single year, and deaths from hurricanes in the last eighteen years *averaging* more than 500 per year, it is obvious that further study of the causes of these disasters is a pressing national problem.

This latest development of the Dewey & Almy Co. is just another example of how the research laboratories of industry can be helpful in solving problems only distantly allied to those in which they are primarily engaged. For even fields as apparently unrelated as meteorological research and container-sealing can work together to mutual advantage, as in this case, where the knowledge of rubber latex gained in meeting the needs of the canning industry has proved of the greatest value in perfecting the new meteorological balloons. Long-range weather forecasting, in its turn, offers the hope of enormous advantage to can-makers and packers through more accurate and farther-reaching predictions of weather conditions.

[4] India Rubber World, Oct. 1, 1936, pp. 35-39.

Lastics[1]

THE phenomenon of elasticity seems common to many substances of high molecular weight. The elastic property also appears a function of the temperature. Cooling rubber results in the formation of a hard brittle product. Polystyrene, on the other hand, a hard solid at room temperature, becomes elastic on warming.

The production of a rubber-like substance through the polymerization of chlorobutadiene focused attention on the fact that the physical properties of rubber are not unique. Polymerized chlorobutadiene or "DuPrene"[2] is not rubber or even a synthetic rubber because it does not contain the isoprene nucleus of natural rubber. Although "DuPrene," strictly speaking, is not a synthetic resin, it may be included in the classification which includes synthetic resins since the method by which it is produced resembles in many ways the reactions used in resin chemistry to build up macromolecules. The word "rubber" is too narrow a concept because it limits not only the physical properties, but also the chemical construction. It is suggested that the term "lastics"[3] be used for that class of substances which possesses rubber-like physical properties, irrespective of chemical structure. The term "lastics" could then be used to cover not only natural rubbery substances (rubber, soft rubber, gutta percha, and chicle), but also synthetic products, e.g., "DuPrene," Thiokol, etc.

A new lastic material both plastic and fairly elastic is named AXF. It is prepared by the action of ethylene dichloride in the presence of aluminum chloride on certain of the aromatic hydrocarbons.

Inasmuch as there is no reaction with sulphur, AXF possesses no aliphatic double bonds and consequently cannot be vulcanized. AXF can be compounded with "DuPrene," Thiokol, or rubber, especially semi-hard rubber stock. With a relatively high content of sulphur, rubber compounded with AXF shows increased resistance to gasoline and to ozone cracking.

[1] "Tailoring the Long Molecule. Plastics." Carleton Ellis, Ellis-Foster Co., Montclair, N. J. *Ind. Eng. Chem.* Oct., 1936, pp. 1130-44.

[2] Trade mark registered.

[3] The term "lastic" is very close to the word "plastic" at least in form, if not in derivation, which might serve to indicate the close chemical similarity. For strictly synthetic lastic products the term "synlastics" might be appropriate. The term lastic would be applied to substances where an applied force deforms the object, but once the stress is removed, the object returns to substantially its original shape. A plastic, on the other hand, is deformable by stress, but retains the deformed shape.

Synthetic Rubber

Joseph Rossman, Ph.D.

THE following abstracts of United States patents treating of synthetic rubber continue the enlightening article from our October issue.

31. Kitsee, 651,364, June 12, 1900. A substitute for rubber consists of a compound substantially as employed in printers' rollers intermixed with celluloid.

32. Schneider, 651,582, June 12, 1900. A substitute for gutta percha is prepared from 45% asphalt tar, 40% resin, 10% spirits of turpentine, and 5% linseed oil.

33. Cordner, 655,169, July 31, 1900. A composition consists of china grass or rhea fiber and the latex of the *Tabernaemontana crassa.*

34. Hornung and Liebl, 656,191, Aug. 21, 1900. A rubber substitute consists of a mixture of rubber, and glue rendered insoluble in water prior to such admixture.

35. Cordner, 667,191, Feb. 5, 1901. A process for the synthetic production of rubber consists of the intimate mixture of cleaned rhea fiber with the latex of the *Tabernaemontana crassa,* their assimilation under heat, the mechanical reduction of the mass to a uniform condition, and treatment of the material during such reduction with a curing agent.

36. Mayer, 676,095, June 11, 1901. A composition to form the cores or packings of elastic cushions consists of 30 parts by weight of glue, 50 parts by weight of glycerin, and ten parts by weight of dextrin, the glue and the dextrin being dissolved in the glycerin.

37. McManus, 680,266, Aug. 13, 1901. To prepare rubber adulterant mix rape seed oil with a solid mineral more or less vulcanizable with oils, heat the mixture, sprinkle the heated mass with sulphuric acid and chloride of sulphur, and then treat with alkali to remove the superfluous acid.

38. Cairns, 680,426, Aug. 13, 1901. A composition consists of vegetable fiber, subjected to the action of caustic alkali and carbon bisulphide in the presence of water, and rubber or gutta percha mixings.

39. Mayer, 681,484, Aug. 27, 1901. A composition to form the cores or backings of elastic cushions consists of 30 parts by weight of glue, 50 parts by weight of glycerin, ten parts by weight of dextrin, and vulcanized vegetable oil.

40. Sherwin and Mathiesen, 688,350, Dec. 10, 1901. To form a rubber substitute mix fatty oils and a gum or its equivalent reduced by a solvent; then gradually add sulphur chloride to the mix, then a coloring agent and then sulphur chloride.

41. Brixey, 714,858, Dec. 2, 1902. To make a crude kerite compound mix together coal tar, asphalt, linseed oil, and sulphur; then heat and vulcanize the mixture.

42. DuPont-Franklin, 746,688, Dec. 15, 1903. A substance resembling rubber consists of 100 parts coal tar, 25 parts boracic acid, and a suitable quantity of oxygen.

43. DuPont-Franklin, 746,689, Dec. 15, 1903. To manufacture a substance resembling rubber mix together coal tar and boracic acid dissolved in alcohol, boil the mixture, and supply oxygen thereto.

44. Strain, 783,710, Feb. 28, 1905. A rubber compound comprises a distillate of rosin having combined therewith linseed oil, china clay, and a rubber solution.

45. Spatz, 786,527, Apr. 4, 1905. A process for preparing a substitute for caoutchouc consists in dissolving amber colophonium in castor oil, subjecting the solution to the action of sulphur while at a high temperature, passing ozone through the solution, and finally treating the mass with chloride of sulphur in the presence of a solvent and calcium carbonate.

46. Roland, 842,839, Jan. 29, 1907. The process consists in mixing glycerin, gelatin, and chromic acid or chromates with a quantity of water, then allowing the mixture to set while retaining the water of hydration in combination, whereby is formed a solid hydrated compound devoid of free water and insoluble in water.

47. Brownlow, 869,618, Oct. 29, 1907. The composition consists of glue, molasses, glycerin, and wood tar.

48. Beresin, 881,536, Mar. 10, 1908. The method of producing artificial rubber consists in treating sun-flower oil with sulphurous chloride, dissolving the mixture in benzine, mixing this solution with one of matezite and of isoprene in benzine, and removing the benzine from the resulting product with the aid of heat and under a vacuum.

49. Adler, 897,334, Sept. 1, 1908. The method of manufacturing elastic chrome-glue compositions as substitutes for rubber consists in adding lead plaster (in combination with adraganth, gum resins, vegetable balsams, water glass, and vegetable fibers treated with acid) to the known basic mass of glue glycerin and chrome salts.

50. Leopolde, 919,248, Apr. 20, 1909. The process produces a product having most of the properties of india rubber and gutta percha. The steps consist in (1) oxidation or polymerization by submitting the hydrocarbons such as spirit of turpentine, or solid hydrocarbons dissolved therein, to an oxidizing agent (H_2SO_4), and (2) separation and purification of the product by neutralization and washing or by distillation, or dissolving in solvent such as CS_2; (3) coagulation and vulcanization of the product.

51. Wiechmann, 932,527, Aug. 31, 1909. A body is formed of vegetable albumen and animal casein impervious to the action of water.

52. Guilleteau-Chaput, 933,645, Sept. 7, 1909. To manufacture artificial leather mix balata gum and dextrin in solution with glycerin and gelatin, knead and mold the mixture, and subject it to pressure.

53. Olsson, 954,991, Apr. 12, 1910. The process consists in mixing gelatinous substances with a hardening ingredient capable of being energized by the action of light, imparting to such material prior to the hardening thereof a coloration adapted to inhibit the chemical action of light, and then molding such material.

54. Schluss, 960,116, May 31, 1910. The composition comprises 1,000 grams gelatin, 1,333 grams glue, 50 grams chromate, eight grams flowers of sulphur, and five grams flaky graphite.

55. Nilson, 964,304, July 12, 1910. The method of manufacturing the rubber-like material consists in making a solution of bichromate of potash, adding to it an acid that will combine with the potash of the bichromate of

potash to liberate the chromic anhydride, and also adding to the solution a substance, as alcohol, to reduce the chromic anhydride to chromic oxide, adding to the resultant liquid glycerin, and mixing the resultant mass with a glue-like substance.

56. Taylor, 989,662, Apr. 18, 1911. Partially vulcanized oil is added to clay having a sulphur content; then the mixture is heated to complete vulcanization of the oil.

57. van der Heyden, 993,626, May 30, 1911. A process of manufacturing an elastic substance consists in heating in water animal materials, as fishes, Mollusca, or the mucous membranes of the intestines of mammals, filtering off the broth thus obtained, evaporating it to form an elastic substance, adding sulphur to it, and vulcanizing the resulting mixture.

58. Taylor, 1,004,934, Oct. 3, 1911. A composition consists of clay and vulcanized oil and nitrated oil.

59. Reif, 1,006,274, Oct. 17, 1911. The process for manufacturing linseed oil rubber consists in mixing sulphur mono-chloride with oil under high pressure in a suitable apparatus, causing the elements thus mixed to escape with a rotary movement and causing them to react, and finally subjecting them to a neutralizing agent consisting of an alkali to make the mixture flake-like.

60. Taylor, 1,017,926, Feb. 20, 1912. To vulcanize oil or resin maintain either at a vulcanizing temperature in the presence of sulphur until vulcanization is complete; then mix the product so produced with a vulcanizable oil or resin and nitrated oil or resin maintained at a vulcanizing temperature.

61. Taylor, 1,020,781, Mar. 19, 1912. A composition consists of clay having a content of sulphur, cocoanut fiber, and oil, the clay in excess of the other ingredients.

62. Taylor, 1,025,217, May 7, 1912. A composition contains vulcanized oil, nitrated oil, and nitro-cellulose having less than 12% nitrogen.

63. Caroselli, 1,031,837, July 9, 1912. To make caoutchouc-like products treat mixtures of oxidized oils and albumens in the presence of a condensation agent with an aldehyde.

64. Reynaud, 1,032,428, July 16, 1912. A process for treating rubber consists of causing an absorbent material, such as non-vulcanized rubber, to absorb oil of turpentine. The oil is divided by successivcly treating with various solutions of sulphuric acid at progressive degrees of concentration at 60° Be. or above, the process being entirely carried out in the cold.

65. Lilienfeld, 1,037,158, Aug. 27, 1912. The process consists in heating a drying oil with an aromatic derivative in the presence of a condensing agent.

66. Olsson, 1,061,111, May 6, 1913. To make an elastic material mix together gelatinous and hygroscopic substances in liquid form and add to this mixture mineral oil and a carbohydrate adapted to take up the water in the mixture and to permit the mineral oil to permeate the mixture; afterward add a bichromate adapted to harden the mixture.

67. Stockhausen, 1,061,881, May 13, 1913. Example 1: 125 grams of powdered gelatin are dissolved in 125 grams of crude glycerin, 28° Be., at about 70° C. Then are added 15 grams of tar and 20 grams of camphor dissolved in 15 grams of acetone. Finally 15 grams of 4% formaldehyde are used for hardening. After very careful mixing the substance can be poured into molds.

Example 2: 125 grams of powdered gelatin are dissolved in 125 grams of glycerin, as before. Then added are 15 grams of wood tar and 20 grams of camphor dissolved in 10 grams of acetone, and lastly 30 grams of flowers of sulphur. To harden use 15 grams of 4% formaldehyde. For better mixing the substance may be passed through rollers or a suitable mill. After the substance has been sufficiently stirred or rolled, it may be vulcanized in molds at 110° C. under suitable pressure.

68. Scammell, 1,073,527, Sept. 16, 1913. The method of producing a substitute for rubber consists in soaking cellulose in a fatty acid, removing excess of the acid, adding the cellulose to an oil vulcanizable by sulphur chloride, introducing chloride of sulphur so that the cellulose is dissolved, and neutralizing the acids formed.

Example: cotton or other suitable form of cellulose is soaked in butyric acid, then removed from the acid when the surplus liquid is dried off. To the oil to be used, say cottonseed oil, is added from 1% to 5% of gum elemi dissolved in the oil by moderate heating. The prepared cotton is then introduced into the oil also in the proportion of say 1% to 5% of cotton. Chloride of sulphur amounting to about 20% of the oil is dissolved in any suitable solvent such as paraffin oil. About one-third the solution of sulphur chloride is now added to the mixture above described, and in eight to twelve hours the cotton dissolves. At this stage preferably a proportion of oxide or carbonate of calcium or magnesium is added to neutralize any acid formed, whereupon the remainder of the sulphur chloride solution is introduced. After about an hour the whole mixture becomes a perfectly homogeneous solid, and advantage can be taken of this period of time to fill tires with the compound, to make golf ball cores, or to cast the material in molds to any desired shape.

69. Clark and Larkin, 1,076,349, Oct. 21, 1913. A rubber-like composition contains lead plaster and sulphurized linseed oil free from free sulphur tending to prevent the composition from oxidizing and hardening.

70. Arsem, 1,082,106, Dec. 23, 1913. The process consists in heating a mixed glycerol ester of phthalic anhydride and oleic acid with sulphur until reaction takes place with the formation of a rubber-like mass. In the preferred form of the invention the mixed ester is prepared as follows. An ester containing free hydroxyl groups is first prepared by heating glycerol and phthalic anhydride to a reaction temperature, about 200 to 210° C., until gas bubbles cease arising. At this stage of the reaction some thickening takes place, which should be interrupted before a jelly-like mass forms. To the resulting mass one molecular proportion, or 282 parts by weight, of oleic acid is added, and heating resumed. Gas and steam are again formed, and at 192 to 195° C. the bottom layer of resin becomes opaque. After continued heating at about 210 to 215° C. the resin and the oleic acid will mix to a deep red. The temperature should be maintained below 230° C. as considerable frothing will otherwise occur. Care should be taken to prevent this by agitating the mixture and regulating the heat; and if this work is done, a gentle reaction will go on, completed after several hours. The resin at this stage is a viscous red liquid. About 20 parts of finely divided sulphur are now added to the resin and thoroughly distributed by stirring. The heating is then resumed with continual stirring until reaction occurs. A dark brown elastic mass having a faint rubber-like odor is formed. The proportion of sulphur may be varied considerably, between 10% and 30%.

71. Gardner, 1,086,361, Feb. 10, 1914. An elastic and resilient mass consists essentially of insoluble solid polymerized wood oil having an insoluble inorganic filling material inseparably incorporated therewith and disseminated therethrough in the form of minute particles. Two hundred parts by weight of wood oil are heated to 250° C., and 50 parts of lithopone are thoroughly stirred into the oil. The temperature is then raised to 280 to 290° C., where it is held about ten minutes; then the mass

(*Continued on page* 51)

Cleaning Rubber Molds by the Bullard-Dunn Process

Floyd T. Taylor[1]

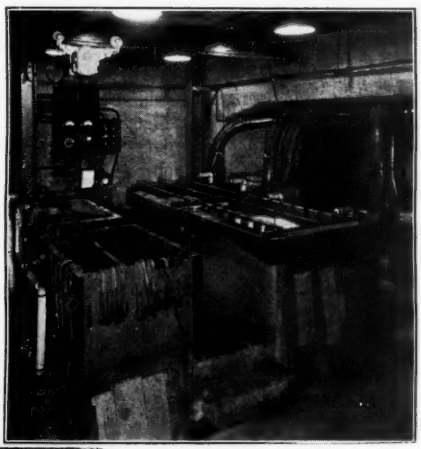
THE application of the Bullard-Dunn process to the cleaning of cast-iron and steel molds, as are used in the rubber industry, is a comparatively new attack on this old problem. When this process is used, time and cost required for mold cleaning are reduced. Moreover no damage is done to the mold by the cleaning process.

An Electrolytic Process

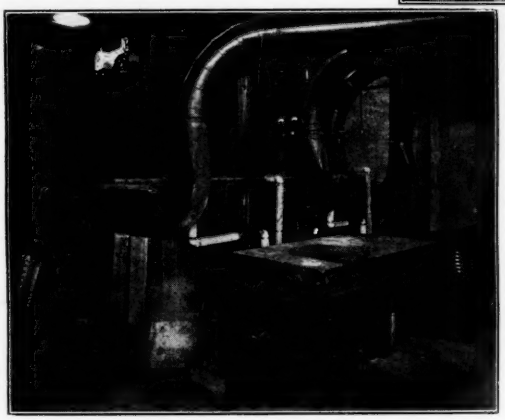
Molds to be cleaned are suspended in an alkaline bath, as one pole of a low-voltage circuit, on metal hooks or in wire baskets between two rows of electrodes of polarity opposite that of the molds. This bath is run just below the boiling point and is kept high in caustic soda. The combination of high caustic soda, heat, and the copious gassing of the electrolytic cell, rapidly removes dirt, grease, and soap residues and tends also to break up and loosen rubber films. This step can usually be completed in 10 to 15 minutes, a sharp contrast in time saving as compared with overnight boiling or soaking.

The molds are next washed in cold water to remove the alkaline solution. They are then placed in the Bullard-Dunn descaling step where they are connected to the cathode pole of the circuit, in an acid electrolyte. A combination of silicon alloy and tin anodes is employed. The electrolyte is heated slightly. Rust, oxide films, and loose rubber are detached by the mechanical action of the gassing which takes place. As areas of the molds are cleaned, they are instantly covered with a thin coating of electrodeposited tin which protects them from acid attack while they remain in the bath. As a result, there is no attack whatever on the molds themselves; only the foreign matter has been removed from their surfaces. This step is also rapid; the usual time required is from two to five minutes.

The final steps consist of rinsing and drying. A jet of compressed air is needed to blow water from blind holes and deep recesses.



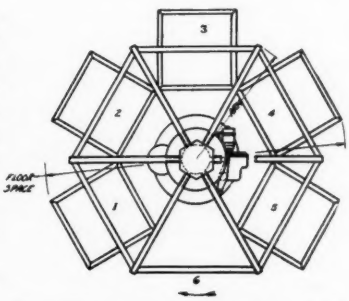
Bullard-Dunn Process Equipment for Cleaning Rubber Molds Electrolytically: the Hooded Vat in the Right-Hand Foreground Provides the Tin Plating Operation; While the One Beyond It Furnishes the Caustic Treatment; the Unhooded Tanks to the Left Contain the Respective Rinsing Solutions



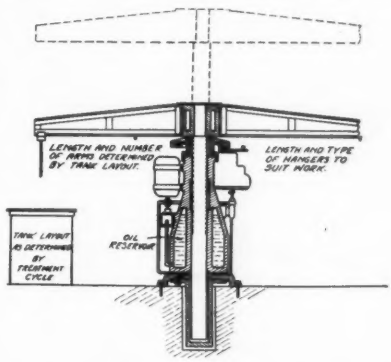
This Picture Shows the Type of Exhaust Hoods and Temperature Controls Used on the Acid and Caustic Vats of the Bullard-Dunn Process Rubber Mold Cleaning Equipment

Mold Surface Protection

At the end of the procedure just described the molds are ready for storage. They are then, as indicated above, covered with a thin coating of metallic tin sufficient to protect the surfaces from rusting, without oiling, provided the molds are stored indoors. The tin film is, however, not a rustproof coating as is ordinarily meant by the term "rustproof." Molds, however, require no "rustproof" protection; therefore in actual practice the tin film gives sufficient protection.



Plan View of the Radiating Mold Carrying Arms of the Bullard-Dunn Mold Handling Machine



Sectional Elevation of the Bullard-Dunn Automatic Mold Handling Device—The Hydraulically Operated Shaft Carries a Turret of Radial Arms Which Rotate According to Indices, Thus Conveying the Molds through the Entire Sequence of Cleaning Operations

[1] Sales engineer, Bullard-Dunn Process Division, Bullard Co., Bridgeport, Conn.

When molds are to be placed back into service after a period of disuse or immediately after cleaning, the tin film can be stripped completely from the surface when for any reason it is deemed desirable to do so. To strip this film the molds are put back into the alkaline bath where deplating requires only about one-half minute. They are then rinsed, dried, and ready to be put into service in the curing presses.

Trapped Designs

When rubber particles have been wedged into holes and undercuts, the cleaning process will not remove them without manual help. However as the bond between the rubber and the mold surface has been broken by the treatment, the removal of plugs and the like by means of a brush or a wire pick is readily accomplished.

The process described has a good "throwing power" which means that it cleans out patterns engraved into the molds. Since there is no attack on the base metal, patterns and also cavity edges are unaffected and remain sharp and of original dimensions, an important consideration in connection with molds which are of very precise specifications.

Mold Handling Determines Cost

The cost of cleaning by this process depends almost entirely on the direct labor cost of handling the molds. This fact should be remembered in selecting the type of equipment to be installed since the process itself works equally well in tanks served manually or in semi and full automatic conveyers. The tank sizes can readily be determined from the average treatment cycle, the number of molds to be cleaned in a unit of time, and the limiting size of the various molds.

Ventilation is required for the tanks which contain the electrified solutions. Simple overhead hoods or suction ducts may be used, depending on the location and type of equipment. The fumes are disagreeable to workmen, but are not poisonous or dangerous.

Electroplating generators are required to furnish a current density of between 40 and 60 amperes per square foot of the projected area of the work. This current density can usually be obtained at less than six volts.

Automatic Mold Handler

The Bullard Co. has developed a full automatic machine uniquely adapted to rubber mold cleaning, which can frequently be installed with advantage for even relatively small production requirements because of its low first cost, its operating efficiency, and its reduction of the direct labor cost per mold cleaned. This machine consists of a vertical central column carrying an hydraulically operated piston. On the top of this piston rigid radial arms are attached from which the molds are hung. The treatment tanks are set around the base of the central column positioned so that work to be cleaned is lowered automatically into a tank, raised from it, and indexed into the next succeeding position, thus completing all electrolytic and rinsing operations in proper sequence without laborious manual handling of the heavy molds. Neither chains nor moving electrical contacts are necessary with this type of machine.

The equipment required for any method of handling is, therefore, simple and already developed. The chemicals are cheap, non-poisonous, and in abundant supply in all markets.

More Frequent Cleaning Is Advisable

This method of cleaning molds is rapid, simple, and low in cost. As previously pointed out, it does not damage the mold surfaces. Consequently there is no reason for running molds long beyond a reasonable limit between cleanings, with the resultant difficulties of removing hard baked-on particles. Mold surfaces are always damaged when vigorous scraping is needed to loosen any such particles.

The process described is covered by patents in the United States and several foreign countries.

Rubber Tire Industry

(*Continued from page* 40)

Rule 13

The use of advertisements or representations of tires or tubes, or of prices thereof, which are in fact applicable only to certain limited sizes, lines, grades, qualities, styles, or brands, without in such advertisements and representations truthfully and unequivocally disclosing the fact of such limitations, having the capacity, tendency, or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

GROUP II

The trade practices embraced in Group II rules do not, per se, constitute violations of law. They are considered by the industry either to be unethical, uneconomical, or otherwise objectionable; or to be conducive to sound business methods which the industry desires to encourage and promote. Such rules, when they conform to the above specifications and are not violative of law, will be received by the commission, but the observance of said rules must depend upon and be accomplished through the cooperation of the members of the industry concerned, exercised in accordance with existing law. Where, however, such practices are used in such manner as to become unfair methods of competition in commerce or a violation of any law over which the commission has jurisdiction, appropriate proceedings will be instituted by the commission as in the case of violation of Group I rules.

Rule A

Where merchandise at wholesale and merchandise at retail are sold in the same establishment, the failure on the part of any member of the industry to differentiate correctly between or identify the two types of transactions, where the result may be to create confusion and deception as to the character of the transaction in the mind of purchasers or prospective purchasers, is condemned by the industry.

Rule B

In the interest of public safety and the protection of purchasers and prospective purchasers from deception, it is the judgment of the industry that the members thereof manufacturing pneumatic automobile tires should mark or brand such tires with words and figures or phrases, molded on or in the rubber of each sidewall of such tires (or otherwise affixed on each such side in some equally permanent manner) which will unequivocally, conspicuously, and truthfully indicate the number of plies existing in the construction of such tires (ply as herein used meaning fabric running from bead to bead of tire), for example: "4-PLY," or "6-PLY," etc.

The failure or refusal so to mark or brand tires as provided in this rule is likewise condemned by the industry.

Rubber around the Globe

E. G. Holt

THE following article concludes the entertaining account of the historical background of the rubber industry and its developments begun in our October issue.

First Rubber Plantation in Mexico

The earliest known American plantation was started in Mexico in 1872. Senor Don Matias Romero, before and later Mexico's diplomatic representative at Washington, somehow was interested in the commodity during his stay in the capital, and "became satisfied that rubber culture was the most lucrative branch of agriculture that could then be undertaken." While enjoying a respite from public life, he chose a location in the Soconusco district of Chiapas, on the Suchiate River near the Guatemalan border, and on his own initiative planted, it is said, 100,000 rubber trees (Castilla). This progressive Mexican, spending his own capital, with no knowledge that any book on rubber existed in any language, and with no idea that any similar undertaking was in prospect elsewhere, based his plantation on a belief in the inevitable decline of forest rubber supplies and published a paper on the subject through the bulletin of the Mexican Agricultural Society in December, 1872. He was forced to abandon his plantation because suspicions and fears of Guatemalan officials as to his intentions were aroused by his proximity to their border.

More than a hint that President Grant may have been interested in rubber in the Seventies is to be found in certain associations between him and Romero during his administration—in his assignment on a secret mission to Mexico of that Lieutenant Church who, partly as a result of his success there, was later chosen to promote the Madeira-Mamore railway around the rapids on the Madeira River in South America so as to furnish an outlet for the produce of Bolivia. (Rubber from Bolivia was later for a long time considered the best in the market.) But the railway had to be abandoned in 1879, British financial support having been withdrawn, and its actual building waited for the rubber boom of 1910. If farsighted attempts to assure future American rubber supplies were then in mind, they were abortive. This whole undertaking, by the way, is said to have grown out of the exploration of the Amazon Valley by Navy Lieutenants Gibbon and Herndon for the American Government in the early Fifties.

Development and Palmy Days of Brazilian Industry

The city of Belem, or Para, was founded in 1615, and the surrounding territory at the mouth of the Amazon began to take on a certain economic importance around 1755. The exports of rubber have been recorded since 1836-37, in which year they consisted of 130,979 pairs of rubber shoes and 141,735 pounds of other rubber. At that time Hancock was using as much as two or three tons of rubber weekly at times, and Brazil was almost the sole source of supply. It was only after 1845 that exports of rubber in other forms regularly exceeded exports in the form of shoes; and only in 1866, after our Civil War, when the law was promulgated opening the Amazon and its branches to international traffic, did the era of real prosperity begin. In 1800 imports and exports together scarcely exceeded 700,000 francs in value, increasing little until after 1836 with the local revolt called the "cabanagem," and more especially with the inauguration of steam navigation on the river in 1853, when rubber exports for the first time exceeded 2,250 tons. From 1868 to 1882 the official value of exports from Para rose from 11 million francs to 65 millions. Rubber accounted for about 78% of the exports at that time, and export taxes amounted to 21% of the value. It is scarcely to be wondered at that in recounting this rise to opulence, Paul Walle entitled his book "Au Pays de L'Or Noir," since rubber had come to take the place of the played-out gold mines of Minas Geraes as the chief source of income for Brazil. And the average annual value of the exports continued thereafter to increase until 1910!

The rubber trade of Brazil became her most valuable foreign trade and a tremendous source of wealth, lifting her again to affluence after the gold mines petered out. In those great days when the majority of the rubber used in the world came from the Amazon, Manaos—the upriver port 1,300 miles from Para and the capital of Amazonas State—had its days and nights of sordid splendor. Thither flocked the rubber sellers and the rubber buyers with money in huge sums. Thither flocked also the men who had toiled gathering the rubber and those who had paddled it down the Amazon hundreds of miles, avid to get the most gaudy change from the solitudes and darknesses and dangers of the forests and rivers, passionately ready to spend their earnings for the solaces that can be bought—those afforded by wine, women, and by riotous, laughing, raw life. Thither also flocked a horde of the human beasts that wallow in the money trough and prey on those who have it—harpies, parasites, purveyors of intoxication, gamblers, panderers of women who came from London and Paris in the steerage and returned in cabins de luxe covered with diamonds. Manaos blazed! No mining town in the height of boom days, not Virginia City, not Tombstone, or Nome ever blazed brighter. But the fires burnt low, and today there remains only the ashes of decadence, save for a few remarkable public edifices.

Founders of Plantation Rubber Industry

Brazil was deposed from her position as queen among rubber producing countries by the development of plantation rubber. The idea that it would be possible to cultivate the Hevea tree in the Eastern tropics is credited to H. A. Wickham, who as a young explorer and planter in Brazil was thoroughly familiar with the tree. His "Rough Notes of a Journey Through the Wilderness," published in 1871, including drawings of the leaf, seed-pod, and seed of *Hevea Brasiliensis*, attracted the interest of Sir Joseph Hooker, then director of Kew Botanic Gardens, London, who in turn enlisted Sir Clements Markham of the India Office, which in 1875 agreed to finance the experiment.

Wickham, then living in Brazil near Santarem, was deputized to secure and deliver a large number of seeds.

That he succeeded in his mission was due to his careful attention to details as well as to chance—and his ability to capitalize upon it. The task was a difficult one. The seeds must be collected at the season when they ripen; they require careful packing so that they would not get damp and yet have enough ventilation to keep them alive; they must not be long out of the ground; they must be smuggled out of Brazil as the government did not permit their exportation. While he was considering how to set about this task, there arrived at Santarem the first of the "Inman Line Steamships, Liverpool to Alto-Amazon Direct," under Captain Murray, the *Amazonas,* with trading cargo for Manaos. Shortly thereafter word came down the river that the entire cargo after being landed at Manaos had been stolen by the super-cargoes, leaving the ship with nothing to carry on the return voyage. The seed was beginning to ripen on the Hevea trees. Wickham wrote to Murray, boldly chartering the ship, made an appointment to meet him at the junction of the Tapajos and Amazon Rivers on a certain date, engaged as many Tapuyo Indians as he could get together, collected seeds on the left bank of the Tapajos, dried them on mats in the shade, packed them in layers between banana leaves in openwork baskets which he induced the Indian women to weave, and when the date of rendezvous drew nigh, loaded them into canoes and met the *Amazonas,* where the crates were slung up on lines in the roomy forehold, safe from ship's rats. In company with the British consul at Para a few days later he secured clearance for the ship with its "exceedingly delicate botanical specimens," without an actual inspection by the officials. The voyage was attended with fine weather throughout, and hatches were kept open for ventilation. The seeds, conveyed by special train from Liverpool, arrived at Kew in June, 1876. A fortnight later 7,000 young Hevea plants were growing there and taxing the capacity of the institution to care for their sudden and unexpected arrival. Mr. Wickham was knighted for his exploit in due course of time and lived not only to enjoy honors, but to see the rubber plantation industry become the source of over 95% of the world's rubber.

Early Experiments in Ceylon

Between Wickham's adventure and the development of rubber plantations was a long interval. The seedlings distributed from Kew went mostly to Ceylon, with small batches to Burma, Java, and Singapore, and a very few to the West Indies. Just what happened to the large consignment to Ceylon is uncertain, but we are told by Dr. John C. Willis that 50 plants were set out at a special branch of the Royal Botanic Gardens at Heneratgoda, and 20 more at Peradeniya near Kandy. About 1881 or 1882 the trees began to flower, and a few seeds and cuttings were distributed to other botanic gardens and such planters as were willing to try their cultivation. In 1888, Dr. Trimen, then director of the gardens, began tapping experiments on the largest tree which he carried on for nine years, averaging only 1½ pounds of rubber a year, and these results made planters believe rubber would not be a paying proposition on plantations. This was the situation in 1896 when Dr. John C. Willis became director; he began detailed experiments, tapping a large number of trees in 1897, the results indicating about 100 pounds of rubber an acre could be expected, which at the higher prices of rubber then prevailing was enough to show fair profit, and from that time planters began to take up cultivation. The first exports of rubber from Ceylon plantings in 1901 were 3.3 tons; by 1907 this had grown to 354.6 tons.

Ridley Advocates Malayan Development

But while Ceylon was progressing slowly, advance was more rapid in British Malaya, where the Botanic Gardens received 22 cuttings from Ceylon in 1877. In 1888, Dr. H. N. Ridley was appointed Director of Gardens and Forests in the Straits Settlements, and he tapped the trees in 1889 to ascertain yield. During that year he is said to have discovered that the flow of latex upon original tapping of a tree was less than the flow induced by reopening the *same* wound by removing another thin slice of the bark. Responsiveness to continued tapping was given the name "wound response" in Ceylon later on, as a result of subsequent tappings *near* the first, but the discovery at Singapore was that this was true when the initial wounds were reopened. The importance of the discovery was not well realized at the time, but it led directly to modern methods employed in plantation rubber tapping which had to be utterly different from those employed by natives in Brazil in order to be successful.

Dr. Ridley was an ardent advocate of rubber planting and probably deserves as much credit for inducing planters to try rubber cultivation as for his tapping contribution which was not publicized at the time. The first commercial rubber plantation was started in Malacca in 1896 by a Chinese, Tan Chay Yan, interested by Dr. Ridley, and several others began planting in 1897; by 1905 Malaya ranked far ahead of Ceylon in rubber planting. The fact that coffee estates in Malaya were in serious straits because of the low price of coffee was the cause of their turning to rubber; except for this condition the development of rubber planting might have been more delayed.

The first rubber plantations started by Europeans in Malaya were by canny Scotch planters, and because of doubtful success in the project they were cautious and saving to the utmost in expenditures. Nothing of the extravagance of later planting boom days was countenanced; stock companies were not organized at first; a man would use his own capital with funds secured from a few personal friends who had been induced to join in the venture. The wise and careful financial management of these early plantations had a great deal to do with their success from the beginning. When the shares of plantation companies skyrocketed in 1910, it is said that many of those early pioneers sold out their holdings, buying in again later after the boom was over.

Forest Rubber Developments

In the period from 1875 to 1900 many other events of great importance occurred. The destructive exploitation of forest rubber went merrily on, stimulated by the upward trend in prices, but production from American sources other than Brazil continuously declined until the last few years of the century, and the production from Asiatic sources showed no appreciable increase. But the exploitation of African rubbers spread to the mainland on the West Coast, then southerly and to the islands of Madagascar and Mauritius on the East Coast and later to the East Coast mainland. In the early Eighties a speculator in Manaos, Brazil, one Joaquim Vianna, conceived the idea of "bottling up the Amazon," and his attempt at rubber market domination there may perhaps be called the early forerunner of modern price control schemes; his attempt failed, but caused prices to rise sharply and helped along the development of African rubbers, to which the Portuguese, British, French, Germans, and Belgians all contributed, the latter most shamefully in the Congo Free

State after 1890. In the last five years of the century British imports from Africa were at their all-time peak, amounting to over 64% of their imports from Brazil during the same period.

Abortive American Plantations

Meantime Americans were not wholly idle. There was some sporadic planting in Brazil along the lines of pathways or estradas used by the tappers on concessions. Secretary of State James G. Blaine secured reports from American consular officers at Para regarding the industry, and an attempt was even made by a private company in the Nineties to develop a plantation of Heveas in Florida. The planting of Castilla rubber in Southern Mexico and Central America was begun on a considerable scale by United States companies, and a bulletin published by our Department of Agriculture in 1903 stated: "American rubber planting enterprises are now *much more extensive* and on a much more secure footing than the English," but the general tenor of the report was to caution investors against overoptimism, and in a closing paragraph the possibility that the wound response factor might give the Para rubber tree a distinct cultural advantage over the Castilla was mentioned. It was only the debacle in rubber prices after 1910, and the coincident Mexican revolutions, that caused the death of the incipient American rubber planting industry. Several small plantations of Hevea were started during this period in Mexico and Central America, and in 1907 there were about 95,000 acres planted to Castilla on 118 plantations in Mexico, where the investment amounted to $60,000,000 Mex.

But the chief developments of the period were in manufacturing technique and new applications of rubber, chief among which was the invention of the pneumatic bicycle tire by John Boyd Dunlop in 1888 (his original purpose was to help his son win a bicycle race), and the first production of pneumatic automobile tires by the Michelin company in France and the Goodrich company in America in the middle Nineties. It would be impossible to chronicle the names of any representative group of the pioneer chemists, inventors, engineers, and physicists who have contributed substantially to the progress of the industry—refinement has followed refinement in rapid sequence and in an ever-broadening range of applications.

The beginning of mass production of automobiles in the United States in 1909, coinciding with the inauguration of government financial assistance to Brazilian rubber interests for the purpose of preventing decline in prices (the real forerunner of present-day restriction schemes), also coinciding with tremendous profits of the early plantation companies in Malaya and Ceylon, was all that was needed to start the greatest boom, ever recorded in any industry, in the London rubber share market in 1910, which literally poured scores of millions of pounds sterling into the development of rubber in the British and Dutch East Indies, whence the plantations have spread to other nearby countries. Forest rubber resources were, except Brazil, already showing clear signs of exhaustion before the plantation industry was stimulated at this time; since 1910 they have steadily declined in importance and today account for less than 2% of world output.

The refinements in tapping methods and the developments in scientific rubber culture by way of seed selection and budgrafting have come subsequently, and Americans owning plantations in the Far East have contributed and even led the way in these. The Stevenson rubber restriction scheme of 1922-28 caused renewed interest in our dependence on foreign sources for rubber and led one great American company to develop large plantations in Liberia, another to start operations in Brazil, and a third in the Philippine Islands, whence operations have recently been extended to Panama and Costa Rica. Meantime great progress, without government subsidy, has been made in the production of commercial synthetic rubbers by other American companies, and these products are gradually gaining headway. There are living today scores of men whose contributions to the industry have been or may be as significant as those of La Condamine, Hancock, Goodyear, and others whose names are here recorded, and the unsuccessful pioneers, who traveled false trails in the trial and error methods of experimentation by means of which progress has been achieved, deserve perhaps equal credit for marking those trails clearly. Whether rubber production which moved from northern tropical America southward and, through Africa, to the East, will in the course of time complete its circuit of the globe and return to the Western Hemisphere, either as regards natural rubber or a synthetic product, who can say?

Synthetic Rubber

(*Continued from page* 46)

is permitted to cool. The product is highly resilient and elastic.

72. Henderson, 1,087,904, Feb. 17, 1914. The method of treating a solid by-product of the animal kingdom of more or less fibrous structure consists in placing the by-product, while in its natural condition, in a solution of salt in water combined with a mixture of water and glycerin, subsequently immersing the by-product in a bath of heated oil, whereby natural fluidity or moisture, surplus water, and the excess of glycerin absorbed by the pores thereof are expelled, separating the by-product into comparatively small particles, and subjecting them to pressure in the presence of heat and vulcanizing ingredients.

73. Lilienfeld, 1,090,730, Mar. 17, 1914. The process consists in heating a drying oleaginous substance with an aromatic substance in the presence of a condensing agent and treating the product of reaction with formaldehyde.

Example: 100 parts by weight of Chinese wood oil are mixed with 100 to 200 parts by weight of orthotoluidine and heated to about 80° C.; whereafter a solution of 11 parts by weight of zinc choloride in 11 parts by weight of water is added to the mixture. The temperature is gradually raised while agitated, and the excess of toluidine is recollected in a distilling vessel connected with the apparatus. When the heating bath, for example, an oil bath or one of molten metal, has reached a temperature of 260 to 290° C., the heating is continued until a specimen of the mass becomes hard and resin-like after cooling. Then the apparatus is emptied, the mass left to cool and washed in a kneading machine, a rubber washing machine, or the like, with water until the latter contains no more chloride of zinc. Then the mass is dried and treated in a kneading machine; whereafter two to 20 parts by weight of a 40% solution of formaldehyde or the equivalent quantity of trioxymethylene are kneaded in slowly and heated for some time. The process, according to this example, may also be conducted so that the aqueous solution of formaldehyde or the equivalent quantity of trioxymethylene is added from the beginning to the mixture of Chinese wood oil and orthotoluidine.

74. Mayer, 1,094,580, Apr. 28, 1914. A rubber substitute is formed of castor oil, 32%; cottonseed oil, 32%; formaldehyde, 3%; petrol oil, 21%; sulphur chloride, 7%; and magnesia, 5%. (*To be continued*)

Editorials

A Concrete Labor Problem

IN THE recent purchase of the India Tire Co. from the Reconstruction Finance Corp. by L. Albert & Son, Trenton, N. J., another chapter has been added to the history of this adequately equipped institution. This chapter may be the final one that covers the passing of this once valiant concern into oblivion; on the other hand, it may prove to be but the beginning of a new volume, recording a revitalized era of prosperous and beneficial business activity. Which of these circumstances may prevail is said by the new owners to be primarily due to whether labor in the Akron district will display a disposition to assume a sensible live-and-let-live attitude toward business, or continue the debilitating offense of allowing their minds and actions to be inflamed against their employers by militant professional outside union organizers, who even quarrel among themselves as to what type of so-called organization principle will attract the greatest number of paying members.

It will no doubt be recalled that the once sound India Tire Co. was confronted with business difficulties during the early depression years that resulted in shutdown and receivership in 1934. Under an acceptable reorganization plan and a suitable opportunity to regain a necessary amount of lost business, W. G. Klauss, president, reopened the plant early in 1935, thus again affording employment to several hundred Mogadore families. With the necessity of serving the regained customers without interruption, a most vital consideration in the attempt to rebuild and perpetuate this re-established institution, Mr. Klauss had no alternative but to recognize the union, whose organizers, supported by government policies, had taken advantage of this delicate situation to incite the workers regarding their purported employer-abused welfare. Briefly the result, as is well known, consisted of the final closing of the plant because the employes allowed themselves to be coerced into making wage demands that thwarted their employer's effort to keep them in jobs rather than to recognize the similarity of their interests and cooperate to the single end that would be desirable to both.

The new owners are negotiating with three different concerns, each of which has in mind restoring the production of tires and tubes, but in each case the attitude of Mogadore labor and the Akron labor situation are paramount considerations.

"After holding the plant intact for a reasonable period of time for the consummation of such a preferred means of disposal, which depends on a speedy solution of the local labor problem," said Sidney L. Albert, general manager of L. Albert & Son, Akron office, "we will dismantle the factory and distribute the equipment to other American plants."

Again we state that workers should recognize that their own best interests reside in establishing an equitable means of bargaining with their employers that does not lose all consideration of the welfare and perpetuation of the business itself.

Softened Rubber

RUBBER manufacturers through many years past quite universally have recognized, complained about, but continued to tolerate the very costly and time-consuming traditional method of plasticizing crude rubber by the sheer brute force of heavy machinery. The well-known operations of rendering crude rubber to a proper plastic state in which it can be fabricated into product constitutes in labor cost and overhead expense a disheartening proportion of the final product cost. To this fact is due very largely the growing interest in manufacturing rubber products directly from latex, also the stimulation during the past few years of developing methods of softening crude rubber by means other than mechanical mastication.

Ungar and Schidrowitz have gone far in this direction. They first addressed their attention to the heat and air treatment of regular crude with greatly increased surface exposure. The successful results of this endeavor suggested the further economy of attempting to obtain the softened raw material directly from latex. These efforts, too, have met with success and have advanced to such a practical stage as would be evidenced by the report that the Boenisari and Pamanoekan Estates of the Anglo-Dutch Plantations, Ltd., are now in regular production with forward commitments for American trade.

The reduction of rubber product manufacturing costs that came from the simplified preparatory operations incident to the use of this new rubber is of ever-increasing interest to rubber manufacturers in the United States. According to authentic reports, the material is in very substantial demand here, even though introduced less than two years ago.

The fundamental advancement in the methods of utilizing rubber such as the softened and powdered varieties, also direct latex applications foretells the passing of the long-used expensive methods of preparatory work in rubber manufacturing.

D C McPoberts

EDITOR

What the Rubber Chemists Are Doing

A. C. S. Rubber Division Meetings

Los Angeles Group

THE Los Angeles Group, Rubber Division, A. C. S., held a meeting October 6 at the Los Angeles Athletic Club, which proved the liveliest ever held. Ninety members and guests attended and thoroughly appreciated the talks by the various speakers on the program.

J. H. Hanson, chief "G" man of the Los Angeles area for the Department of Justice, told of his experiences and indicated how members of the group can aid the efforts of the Federal Bureau of Investigation to stamp out crime.

H. Perlish, of Chas. T. Wilson Co., Inc., 99 Wall St., New York, N. Y., spoke on crude rubber. He is an interesting speaker and thoroughly well versed in his subject.

J. W. McGrath, formerly of the Los Angeles Group and now manager of Technical Service for Goodyear Tire & Rubber Co. of Australia, was introduced by Chairman Balazs and responded with some interesting comments about Australia.

Motion pictures were exhibited of the recent fishing trip made by group members to Coronado Islands, Mexico. A vote of thanks was extended the H. M. Royal Co. for taking these pictures, which may be borrowed for exhibition by other rubber groups. An interesting fishing picture taken by Phil Drew, of Goodyear, also was shown.

Election of officers for 1937 will take place December 1, 1936. The nominating committee comprises Chas. Lamb, of West American Rubber Co., Bill Reeder, of United States Rubber Co., and Bert Dougherty, of B. F. Dougherty Co.

The October meeting door prize was won by D. E. Bell, of Erwin Miller Co., Fullerton. The prize, a carbonation siphon, was contributed by F. H. Butcher Co. A box of cigars donated by the D. & M. Machine Works, Torrance, Calif., was won by Carl Stentz, secretary-treasurer of the group.

Dinner favors supplied by T. Kirk Hill, of the Kirkhill Rubber Co., Los Angeles, consisted of beautiful white non-slip bath mats imprinted with the A. C. S. insignia. The latter feature was donated by Mr. Follett, of Naugatuck Chemical, as a product of that company. The favors were thus a cooperative gift.

Owing to the federal election the November meeting of the group will be held the fourth of the month at the University Club, Los Angeles. The program of this meeting will feature aviation. The Pan American Airways will present its picture "Flying the Lindbergh Trail," the first aerial motion picture of South America, showing the crossing of the Andes and many dramatic jungle scenes in the circuit of 33 countries. C. B. Carlton, of J. M. Huber, Inc., manager of technical development at Borger, Tex., will talk on "Laboratory Methods for the Evaluation of Carbon Black in Rubber." Reginald Denny, movie actor and president of Reginald Denny Industries, Inc., maker of model airplanes, will be present and display miniature aircraft.

H. M. Royal Co. has donated two tickets to the Southern California-Notre Dame football game to be raffled at the November meeting.

A tournament is being planned by the golf committee, Hammer, of Firestone, and Montgomery, of Martin Hoyte & Milne. The event is dated tentatively as of October 31 or November 14, definite decision to be announced. Many prizes are promised. The winners of each tournament, which number seven members, will have a playoff for the permanent ownership of the large and beautiful cup.

New York Group

THE fall meeting of the New York Group, Rubber Division, A. C. S., was held Friday evening, October 9, in the clubrooms of the Building Trades Employers Association, 2 Park Ave., New York, N. Y. Approximately 150 members were present at the dinner and the entertaining and instructive program which followed.

V. A. Cosler, rubber chemicals division, E. I. du Pont de Nemours & Co., Inc., spoke on the subject "Commercial Application of Chloroprene and Butadiene Rubber," followed by a number of lantern slides showing some of the many products that are now made of "DuPrene"[1] because of its superior properties for specialized services. Mr. Cosler said that the manufacture of homologs of isoprene in Germany and Russia is probably part of their national economic planning program to save foreign exchange by reducing imports of crude rubber, and in case of war, to be more independent of foreign raw materials. Germany formerly made as much as 30 tons of methyl rubbers B, H, and W per month. These resulted from varying the conditions of polymerization of dimethyl butadiene and produced products that could be used alone or in mixtures with reclaim and crude rubbers. Except for hard rubber their products were in general inferior to those of crude rubber and difficult of processing. The later developments, Buna 85, 115, N, and S, are made of butadiene and in general are all that is claimed for them as to quality of products, although the lettered varieties are most difficult to process. About 60 tons per month of these grades are now produced, but this figure will be increased shortly to 200 tons per month.

Less is known of the Russian situation. It is generally supposed that the greater part of their production is similar to Buna 85 and 115 and that Sovprene is similar to "DuPrene." Samples apparently have never become available outside of Russia for examination. The stimulus of "DuPrene," unlike the aforementioned developments, is naturally an economic, not a nationalistic one; therefore the rapidly increasing demand for and application of it to commercial products arises out of its superior performance of many functions heretofore employing rubber for want of something more suitable.

In his introduction of David Shirk, president, Rare Metal Products Co., Belleville, N. J., Group Chairman R. D. Gartrell pointed out that the aims of the New York Group include the promotion of not only technical, but also social and cultural communion among its members. Mr. Shirk's fine collection of colored slides and comprehensive description of them were offered as a contribution to this latter aim.

Although Mr. Shirk's world-wide survey of antimony deposits, and other interests, have taken him nearly everywhere on earth, he confined his subjects to those situated in the general region of the rubber plantations. Photography is his hobby, and all of the pictures were taken by himself, although the slides were made and hand colored by professionals. Among the subjects of outstanding interest were the ruins of Angkor, Balinese natives, Hindu cremation in the open, and the sumptuous palaces of the Mogul Em-

[1] Trade mark registered.

pire. Of utmost interest was this selection of the approximately 400 pictures shown, the excellence of which was exceeded only by the vivid descriptions given by Mr. Shirk, whose expressed personal experiences, and historical background gave to his audience appreciation little short of that of an actual trip to those strange lands.

A short business session resulted in the appointment of a nominating committee to select officers for next year, and a program committee for the Christmas party to be held Friday night, December 18, 1936. The members of the nominating committee are: Carl Wright, chairman, Bruce Silver, A. R. Kemp, W. L. Sturdevant, and J. P. Coe; and of the program committee: L. A. Edland, Pete Murawski, and W. O. Hammister.

Chicago Group

THE Chicago Group, Rubber Division, A. C. S., began its 1936-37 season by holding a special ladies' night program on October 16 at New College Inn, Sherman Hotel, Chicago, Ill. Music and entertainment were furnished by Roger Pryor, who conducted his band and directed a large cast of entertainers for the floor show. There was no technical program. Dinner was served, and the evening was spent in social festivities.

Boston Group

THE Boston Group, Rubber Division, A. C. S., will hold its fall meeting at Hotel Kenmore, Boston, Mass., November 24. The speakers will be Dr. I. Drogin, chief chemist, J. M. Huber, Inc., New York, N. Y., and Dr. J. R. Katz, of the University of Amsterdam. Dr. Drogin's topic will be "An Outline of Carbon Black," and that of Dr. Katz, "The Structure of Highly Polymerized Substances." The speeches will be preceded by a dinner at 6.30. Reservations may be made by communicating with R. J. Noble, secretary-treasurer, Malden, Mass.

Future Meetings

THE American Chemical Society lists dates and places of its forthcoming sessions as follows:

93rd Meeting. Chapel Hill, N. C., April 12 to 15, 1937.

94th Meeting. Rochester, N. Y., September 6 to 10, 1937.

95th Meeting. Dallas, Tex., April 18 to 21, 1938.

96th Meeting. Milwaukee, Wis., Fall of 1938.

14th Midwest Regional Meeting. Omaha, Neb., April 29 to May 1, 1937.

Symposium on Molecular Structure, Division of Physical and Inorganic Chemistry. Princeton University, December 31, 1936, to January 2, 1937.

Third Chemical Engineering Symposium, Division of Industrial and Engineering Chemistry. Columbia University, New York, N. Y., December 28 and 29, 1936.

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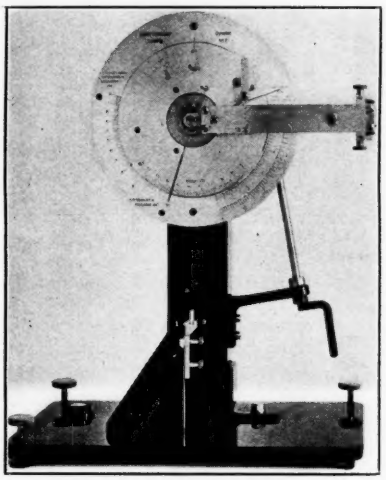
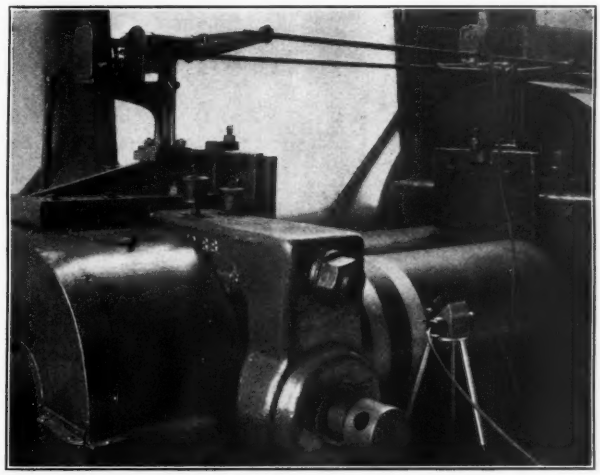
New Machines and Appliances



Schopper Dynstat Tester



Thropp Roll Stop Testing Apparatus

Dynstat Testing Machine

THE new Schopper Dynstat testing machine is used for determining dynamic and static bending strength of plastics, hard rubber, synthetic resins, and similar molded materials. It is said to permit making every mechanical test to which makers and users of insulators and other molded materials attach significance. Test specimens for this tester do not require special preparation, but can be made from the finished articles. For determining impact bending strength, the tester is equipped with two hammers which permit making tests of 0 to 10 cm/kg. and 10 to 20 cm/kg., working capacity from a drop angle of 60 or 90 degrees. For statical bending strength tests the ranges are 0 to 5, 0 to 9.8, and 0 to 40 cm/kg.

For determining impact bending strength the specimen is placed on an anvil of special design, and the pendulum is allowed to fall free from a pawl. An idle pointer on the left then indicates the rise of the pendulum on the corresponding scale after the impact and provides a reading of energy absorbed. For a statical bending test the specimen is clamped on the rotating axis of the machine and is subjected to bending by turning the center part of the scale dial, to which it is also secured, by means of a crank and worm gear. This causes the pendulum to move to the right, and the value of the bending moment is measured by the right-hand idle pointer. Impact bending strength is made in the Izod system, and the clamps for the statical bending test are of the Naumann-Schopper design. Testing Machines, Inc.

Roll Stop Tester

THIS apparatus consists of an electrically operated pencil for testing the stopping distance of inrunning rolls. Machines in every factory should be checked at least four times a year with this instrument as a safety precaution. The set-up of the apparatus for a test is simple: Two or three strips of paper about two inches wide are wrapped around the machine roll, and the ends overlapped about two inches and pasted together, making certain that the lap is opposite in direction to the rotation of the roll so that the pencil point will not catch on the edge of the lapped joint. Next the solenoid-operated pencil and the tripod are assembled, and the tripod is set up in front of the roll to be tested. The tripod should be set so that the two legs which have the pencil adjusting slot between them are placed parallel to the roll center line. The adjustable tripod legs are used to set the pencil as nearly perpendicular to the roll face as possible. Make sure that the apparatus is set up firmly so that machine vibrations will not upset the tripod or cause the pencil to shift.

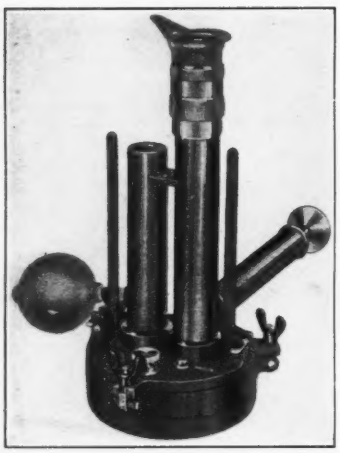
The mercury switch of the apparatus should be clamped over the safety lever bar at such an angle that, when the safety lever is moved far enough just to open the mill or calender safety switch contacts, the mercury switch breaks contact at the same position. It is recommended to remove the safety switch cover to see that the safety lever arm is in the proper position by just opening the safety circuit. Once this adjustment has been made, the safety lever can be set in the normal position. The mercury switch is then plugged into either of the two receptacles on the base of tester, and the 110-volt, 60-cycle power supply is plugged to the other receptacle. This energizes the pencil solenoid; then the final adjustment of the pencil to the roll can be made. The pencil should be set so that it is approximately $\frac{1}{16}$-inch away from the paper on the roll when the solenoid is energized. De-energizing the solenoid allows the pencil to be pressed against the paper by means of the pencil spring.

The length of the pencil record on the paper strip around the roll is the distance traveled by the roll surface after application of the brake by the safety lever on the machine. Wm. R. Thropp & Sons Co., Trenton, N. J.

Dust Counter

THE dust counter pictured is a practical shop tool and combines in one piece of moderately priced equipment everything you need for checking dust conditions in your plant. The instrument combines in one unit both the necessary air sampling device and a dark field microscope viewing and counting system, mounted on a circular base, provided with illuminating apparatus and suitably cased for safe transportation and storage.

The air sampling mechanism consists of a moistening chamber through which the air is drawn by means of an accurately calibrated hand pump of 1/1000 cubic foot capacity and an impinging device which deposits the dust particles suspended in the air on a circular glass plate within the instrument. The dust deposit is in the form of a ribbon. Twelve samples may be collected on one slide. These samples may be viewed and counted at once without



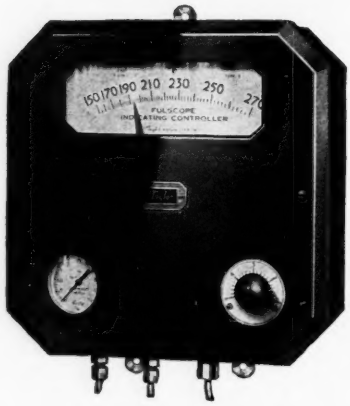
Dust Counter Ready for Air Sampling

removal. They may also be preserved for future reference simply by sealing a cover glass to the slide or, when desired, examined on the stage of a regular laboratory-type compound microscope. Bausch & Lomb Optical Co.

Indicating Controller

A MODERATELY priced, highly adaptable, air-operated controller of the indicating type for temperature and pressure has been made available for the many processes where close throttling control is imperative, but a record of the processing is not essential. Many of the design and performance features of this new instrument previously have been available only in the renowned Taylor Fulscope recording controllers. Practically every advantage of a custom-built instrument is possible through the great diversity of optional construction features. Of even greater importance is the simplicity of the numerous adjustments by means of which the controller may be adapted to changes in future processing needs.

The outstanding features follow. Either high-range or full-range sensitivity is possible, as required; the former for processes having small time lags; the latter for time lags of any magnitude. Both are fully adjustable by turning a graduated dial. The control point may be adjusted to any value within the control range. Direct-set feature is optional. Controller action may be quickly reversed in the field by altering the position of a link. There are many standard control ranges to choose from within the limits of minus 100 and plus 1,200 F., or full vacuum and 3,000 pounds of pressure. Control ranges are interchangeable. Temperature controllers may be equipped with mercury-, vapor-, or gas-actuated tube systems. The large scale with bold numerals and graduations enables the operator to make accurate observations from a distance. Finally, the smartly designed, black finished cast-aluminum case is available in both face and flush mounting styles. Taylor Instrument Cos., Rochester, N. Y.



Taylor Fulscope Temperature and Pressure Indicating Controller

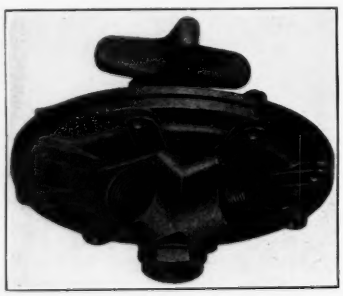
Air Pressure Regulator

A NEW low-capacity regulator, Type HFS, is designed for sensitive regulation of air pressures below 30 pounds. It is positive, dependable, and accurate in service.

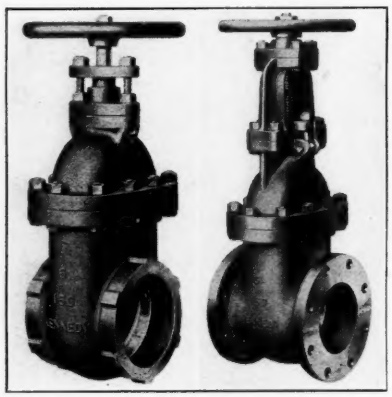
Regulated air pressure can be graduated up to 30 pounds with but one ounce variation for each 10 pounds' variation of main line pressure. That is, a variance of 40 pounds in main line pressure will cause only four-ounce variation in the regulated air pressure. The diaphragm is clamped in the regulator body between two brass castings fastened together by radially spaced bolts. Special valve design and construction prevent the valve seat from cutting into the rubber valve. The De Vilbiss Co.

New Valve Line

A NEW line of standard iron-body wedge gate valves developed by The Kennedy Valve Mfg. Co., has several features which interest engineers and other users of valves. The metal in these valves, of particularly dense structure, is more than 50% stronger than ordinary cast iron. To insure further strength and rigidity the bodies are of oval section with well-rounded corners, the flanges and bolts are heavy, and ribbing is provided at the flanges on the larger flanged-end valves and at the yokes and caps of outside-screw-and-yoke valves. All bolts have the nuts above the flanges and with ample



De Vilbiss Air Pressure Regulator Type HFS



Kennedy New-Type Valves

room for standard open-end wrenches. In addition both non-rising stem and outside-screw-and-yoke types have special provisions to facilitate repacking. The stuffing-box bolts and nuts, moreover, are rust-proofed to prevent corrosion. Heavy bronze bushings are used wherever the stem passes through a cast-iron part, as at the yoke cap, packing gland, and stuffing box. These bushings prevent corrosion and scoring of the stem which might make operation more difficult and wear out the packing quickly.

The screwed-end valves have round ends for best distribution of metal and lugs for convenient application of pipe or chain wrench. Handwheel rims, of oval section, have only five spokes, permitting ample room for the operator's hands, even if gloved. The disks, reenforced with interior posts, are self-draining in any position, reversible, and interchangeable. Stems have acme standard threads with thread contact surface at least 1½ times the stem diameter. Special provisions in both non-rising stem and outside-screw-and-yoke types keep the stem in perfect alinement at all times. These valves are made in all standard sizes from 1½ to 60 inches for steam working pressures of 150 pounds and water working pressures of 200 pounds.

"DuPrene"[1] Withstands Sunlight[2]

A REPORT by the Materials Division at Wright Field showed rubberized balloon cloth had a normal gas escapage of 15 to 19 liters per square meter in 24 hours. Under the same conditions "DuPrene" fabric allowed only an escapage of one liter to three liters. Moreover after six months' exposure to direct sunlight the "DuPrene" balloon cloth allowed only 11 to 17 liters of hydrogen to escape; whereas the normal rubber balloon cloth had so far deteriorated as to permit the escape of from 70 to 80 liters per square meter.

[1] Trade mark registered.
[2] *Du Pont Magazine*, Sept., 1936, pp. 15, 24.

New Goods and Specialties

Rubber in New Streamlined Street Cars

NEW streamlined street cars, 212 in all, embodying new and revolutionary uses of rubber in their construction and featuring speed, quiet operation, comfort, and safety, will be in service in three large cities this fall. They will be divided up as follows: 100 in Brooklyn, 25 in Baltimore, and 87 in Chicago.

An important factor in the silent operation and easy riding qualities of these cars is the unusual use of rubber parts in the construction of the trucks and body. More than 400 pounds of rubber are used in each car, considerably more than goes into the average motor truck or bus including the tires.

Besides rubber springs the cars have a unique type of rubber insulated wheel so constructed as to prevent noise or vibration from telegraphing between the rails and the body of the car. This insulation is obtained by use of rubber and steel disks which connect the hub with the rim of the wheel. The rubber disks in the wheel separate the metal tire from the rest of the wheel; while the hub of the wheel and the axle are also separated from the frame of the truck by rubber. These rubber parts, the first of their type ever made, are furnished by United States Rubber Products, Inc., 1790 Broadway, New York, N. Y., in accordance with specifications of the Electric Railway Presidents Conference Committee.

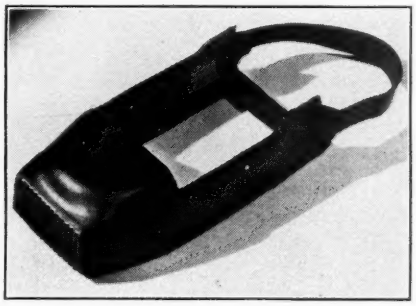
This unusual use of rubber provides a car noiseless within and without. So quiet are they in operation that it is claimed the singing of the overhead trolley is the loudest audible sound.

In addition to the unprecedented use of rubber in the cars, they are ultra-modern in every other respect. Form-fitting seats upholstered in leather with satin finished stainless steel tubular frames, non-glare lighting, scientific ventilation and heating provide further comfort for passengers. New types of motors, controls, and brakes were developed to give the new cars fast and smooth acceleration and retardation, as necessary.

The use of rubber to combat noise and vibration in railway equipment is increasing. U. S. Rubber has been called on by several equipment manufacturers and street railway companies for expert consultant service regarding new application of rubber.

Rubber Kicking Toe

A DEVICE of special value for football players is a rubber kicking toe designed for wear over the forepart of a regular football shoe. This toe is made entirely of rubber in three sizes to fit either foot and is quickly slipped on or off. It was first introduced this season and met with prompt approval in the early practice games. It can be used for kick-offs, for all place kicks, and for conversions. It not only adds to the efficiency of the kicker, but gives him confidence while the extra weight gives him greater distance. Jas. B. Dick Co.

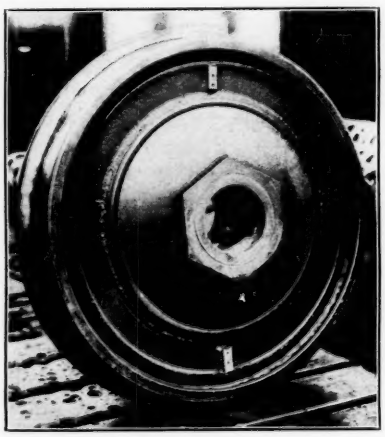


Dick Football Kicking Toe

End Jiggles in Movies Made on the Run

WHEN motion pictures are being made on the run, the fast-moving camera must travel as smoothly and with as little vibration or shock as possible or the picture will necessarily look jiggly. One of the larger Hollywood producing companies found that the camera cars used by other studios were too large and cumbersome for long and fast trips and not smooth enough as to riding quality for rock-steady camera work; so it equipped a light station wagon with low-pressure streamline Jumbo tires, which permit a wide variety of air pressures, solving its problem when it has to work in out-of-the-way places, away from smooth pavements. These tires are made by The General Tire & Rubber Co., Akron, O.

"We can hit pretty good speeds on the highways in making shots in which we are preceding or following traffic being photographed," said Pat Dowling, Hollywood picture producer. "The average boulevard may seem as smooth as glass to most motorists, but in making moving shots in motion pictures, every little tarred joint in concrete pavements, and every small spot of patched or uneven surface is likely to show up a 'jiggle' in the picture. With tires that iron out the rough spots, this difficulty is overcome."



New Rubber Mounted Wheel

General Jumbo Tired Station Wagon

Editor's Book Table

NEW PUBLICATIONS

"Robertson Reminders." Vol. 4, No. 3, October, 1936. John Robertson Co., Inc., 121-125 Water St., Brooklyn, N. Y. The issue illustrates and describes high-pressure pumps and a complete line of hydraulic equipment manufactured by this company which has been established for "78 years in one line of endeavor."

"Belting, Packing and Hose." General Atlas Carbon Co., 60 Wall St., New York, N. Y. Briefly sketched are the origin, need, and development of belting, packing, and hose for the operation of mines, mills, and railroads.

"Thiokol Facts." Thiokol Corp., Yardville, N. J. Vol. 1, No. 3, of this folder contains news and notes of recent application of Thiokol in the oil and automotive industries, submarine cable covering, and synthetic rubber molding.

"The Vanderbilt News." R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. The September-October, 1936, issue contains interesting text, formulae, and test data on "Cutting Costs with Kalite," "Sponge Rubber Compounding," "White Stocks with Increased Resistance to Sun Cracking," "Oil Resistant Rubber Compounds," "Dispersing Agents—What They Do and Their Significance for Latex and Other Industries," "Random Reminders."

"Laytex. The New Dielectric in Communication and Control Wires and Cables." United States Rubber Products, Inc., 1790 Broadway, New York, N. Y. This manual for engineers, contractors, and designers gives detailed information, graphs, and tables indicating the characteristics and proper uses of the various types and gages of Laytex insulated communication cables, fire alarm and police signal cables, supervisory control cables, telephone cable, outside telephone wire, inside telephone wire, and emergency telephone wire.

"Dowtherm for High Temperature Heat Transfer Systems." The Dow Chemical Co., Midland, Mich. This treatise familiarizes the engineer with a type of product that is distinctly a new liquid heat transmission medium in many industries. It is one that has opened the possibility of better methods and processes involving the requirement of controlled heat transfer. In this range of application Dowtherms come as a distinct advancement over the less desirable means of direct firing or high-pressure steam and have a record of proved ability and safety.

"Does Unionism Really Benefit American Labor." By Allen W. Rucker in collaboration with N. W. Pickering, president, Farrel-Birmingham Co., Inc. Published by the Farrel-Birmingham Co., Inc., Ansonia, Conn. Single copies free on request. Available in quantities at nominal rates.

This pamphlet of 18 pages, eighteenth in a series of booklet editorials by the same authors, is a digest of the first study of its kind, a comparative factual analysis of end results to American labor working under two opposing systems, union and non-union. The authors based their study on the official record of industrial operation reported by the United States Census of Manufactures representing the major producers of consumption goods. The comparative benefits to labor of the trades union theory have been checked against the actual end results reported by the Census of Manufactures. For the industries and periods examined the official record of industrial operation fails to confirm the benefits predicted by the theory. Instead, the normal operation of the American system was definitely superior in its results on all accounts, amount and increase in annual income, security of employment opportunity, and total purchasing power distributed as wages.

"Condensed Preliminary Report on the Trade of Canada, 1935-36, With Comparative Statistics for the Years 1933-34 and 1934-35," Department of Trade and Commerce, Dominion Bureau of Statistics, External Trade Branch, Ottawa, Canada. This convenient reference consists of two sections, a "Review" and a "Condensed Statistical Record" of Canadian trade. The "Review" deals with the volume and value of the Dominion's external trade; its fluctuations, distribution, and routes of transportation are examined in respect to both current conditions and recent variations. Several new analyses are included in the present report, Canada's progress and her present position among the leading trading nations of the world being explained in detail. The "Condensed Statistical Record" of Canadian trade now covers 98 countries, the commerce with which is segregated and dealt with in detail. This is the only official report containing trade statistics in this form. There are also summary and analytical tables dealing with Canada's trade as a whole. Copies of this report are now on sale at a nominal charge of 25¢ by the King's Printer, Ottawa, Canada.

(*Continued on page 64*)

BOOK REVIEWS

"Compounding Ingredients for Rubber. Composition, Properties, and Functions of Materials Employed in Dry Rubber and Latex Compounding Practice." Compiled by the editors of INDIA RUBBER WORLD, New York, N. Y. 1936. Bill Bros. Publishing Corp., 420 Lexington Ave., New York, N. Y. Cloth, 226 pages, 5¼ by 7¼ inches. Fully indexed. Price $2.50 postpaid in U. S. A.; $2.75 postpaid other countries.

For the first time the salient facts regarding the many hundreds of rubber compounding materials used in the American industry have been assembled in book form for the benefit of those persons engaged in the rubber business or who are in any way interested in its compounds. All items are grouped by their trade names alphabetically in functional classifications, showing concisely the available data on composition, source, application, form, properties, specific function, and facts regarding the methods of use. The ingredients for dry rubber compounding are treated in Part I; while those for the rapidly growing practice of latex compounding are covered in Part II.

The volume is provided with triple indexes as follows: first, "Materials Index—General," with ingredients listed alphabetically according to their correct trade names; second, "Materials Index—Functional," in which the materials are grouped according to their principal utility in compounding; and, third, "Seller's Index," which lists the various sources of supply by company name, showing the respective materials of each in functional order.

"The Chemistry of Rubber." By H. Freundlich, University College, London, with 13 Diagrams. The Chemical Publishing Co. of N. Y., Inc. (Exclusive Agents in North and South America), 148 Lafayette St., New York, N. Y. 1936. Cloth, 72 pages, 4 by 6½ inches. Bibliography. Index. Price $1.25.

This small volume outlines in untechnical language a concise statement of current scientific opinion regarding latex, rubber, remarks on the botany of latex-producing plants, and on the history of the rubber industry. Copious references are supplied to the literature of rubber research.

"Handbook of Chemistry and Physics." Twenty-first Edition, 1936. Chas. D. Hodgman, Editor-in-Chief. Published by Chemical Rubber Publishing Co., Cleveland, O. Flexible leather 2,028 pages, 4¾ by 6¾ inches. Price $6.

(*Continued on page 70*)

Rubber Industry in America

OHIO

ADDITIONAL increases in production schedules were evident lately in manufacturing circles as many factories received automobile parts orders in larger volume than for some time. As a result steel mill operations were further advanced in several centers, and eight more blast furnaces were in production in early October than in September.

Tire plants continue active for this season, although the peak of replacement buying has passed. Rather large inventories of finished tires are being maintained because of the unsettled labor situation in Akron.

Bowling Green Rubber Co., 1202 Prospect Ave., Toledo, closed recently following a strike of about 80 workers connected with the United Automobile Workers' Union. Non-striking employes who worked until the plant was shut belong to the Bowling Green Employes' Association with which Stanley Roberts, company head, said the firm had signed a contract calling for a 5 to 10% wage increase and recognized seniority rights. It will become effective within the next six months. Strikers demanded a contract granting union recognition, seniority rights, increased wage scale, and better working conditions. The firm, which manufactures molded rubber goods, employs both men and women.

Maple City Rubber Co., Norwalk, suspended operations early last month after its employes, affiliated with the United Rubber Workers of America, went on strike demanding improved working conditions. The firm, headed by Claud Martin, employs about 40 persons, mostly women, engaged in making toy balloons.

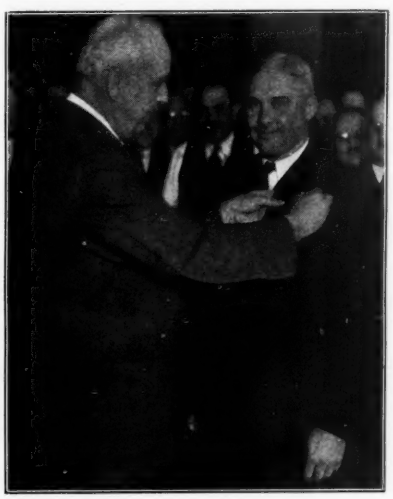
W. A. Harshaw, founder of the Harshaw Chemical Co. in 1892 and president from its start, has become chairman of the board of directors. W. J. Harshaw, formerly vice president in charge of production succeeds his father as president of the company. Starting with a small plant in Cleveland, the business of the Harshaw Chemical Co. has grown tremendously under the direction of Mr. Harshaw, Sr., and the company now operates three large modern plants located at Cleveland, Elyria, and Philadelphia. The offices and laboratories are located in Cleveland and the company maintains branch establishments in the principal cities throughout the United States.

Goodyear News

P. W. Litchfield, president of The Goodyear Tire & Rubber Co., Akron, on October 13 stated the return of more normal business conditions and the remarkable resurgence of the automobile industry since 1932 are combining to bring about an increasing demand for rubber tires so that 1936 production is expected to total 52,000,000 units, the largest output since 1930 and not far below the volume of that year.

Total sales may exceed production by a slight margin. Approximately 29,000,000 tires will be purchased for motor vehicles already in operation in this country; while probably 22,000,000 units will be needed as original equipment by automobile and farm implement manufacturers. The total volume of export business is estimated at 1,300,000 units, besides those manufactured abroad by American companies with foreign plants.

Crude rubber consumption in 1936 will probably be greater than in any previous year, exceeding even the high levels established in 1929. An important factor leading to this record consumption is the increasing amount of freight moved by auto truck and the resulting demand for pneumatic truck tires. At present 35% of all expenditures for renewal purchases of pneumatic tires are for truck tires, and the percentage of the tire dollar devoted to this purpose is growing. Even the worst years of the depression saw relatively little decline in the number of unit sales of truck tires.



President Litchfield Giving Vice President Slusser His 25-Year Pin

A second market of growing importance for the tire industry is found on the American farm. Rubber tires for farm implements were introduced in 1932, but already there is widespread appreciation of the advantages they offer, and demand is increasing rapidly. Original equipment and renewal sales of farm implement tires, much larger and heavier than those on passenger cars, are expected to total 100,000 units in 1936.

The outlook for the rubber industry has been improved not only by these growing markets for tires, but also by the comparative stability of crude rubber prices within recent months and the absence of widespread price cutting. A much better balance between supply of and demand for tires over the past year has removed the economic pressure in favor of price cutting and has resulted in a considerable degree of price stability, which should be reflected in improved earnings for the leading rubber manufacturing companies.

Goodyear has benefited considerably from this improvement in the industry. Since a large amount of its tire business is in the original equipment field and it supplies the entire requirements of Plymouth, DeSoto, Dodge, Chrysler, Hudson, Terraplane, and Nash, as well as a large part of the requirements of Packard, Ford, and other manufacturers, the company has gained from the recent increase in the price of original equipment tires.

Renewal sales for several months have continued at a satisfactory level at the higher prices made effective in May, 1936. Also contributing to current improvement are the various Goodyear subsidiaries, including the rubber and cotton plantations, the company's cotton textile mills in New England and the South, and its retail store division. For the first time in several years every subsidiary company is operating at a profit and justifying the capital investment in it.

Over a period of years Goodyear has followed a policy of decentralization to locate its manufacturing plants at strategic points, in large market areas, to avoid excessive overhead and transportation costs. Since this policy has been put into effect gradually, a high degree of decentralization has already been achieved without excessive capital expenditure or the unnecessary abandonment of existing facilities. The re-

sult is that Goodyear no longer is dependent on Akron for most of its tire output, but can produce a considerable part of its requirements at such widely scattered points as Cumberland, Md., Gadsden, Ala., and Los Angeles, Calif., and also in five foreign countries.

Personnel Activities

Goodyear recently held its interplant conference in Akron. The conference, held annually since 1916, is comprised of superintendents from the company's 18 plants throughout the world. One of the speakers was W. F. Bloor, Goodyear chief statistician, who measured mathematically the extent of business recovery.

Lee Forest, purchasing agent at Goodyear's Wolverhampton plant, sailed for England on October 7 after a visit to the United States.

Clifton Slusser, who came to Goodyear in the service department in 1911 and climbed to the vice-presidency in 15 years, recently was given his 25-year service pin by Mr. Litchfield. About 250 production and staff heads witnessed the ceremony, as did the Old Guard, the half dozen employes whose service dates back to the first years of the company's history. Mr. Slusser became secretary to William Stephens shortly after joining Goodyear, organized the staff personnel department, went to California as the first superintendent of the Los Angeles plant in 1920, returned in 1922 to be factory staff manager, and succeeded Mr. Litchfield in 1926 in charge of production in all Goodyear plants around the world.

General Tire & Rubber Co., Akron, and the management of Stomil, S. A., Poznan, Poland, the only automobile tire manufacturing concern in Poland, recently signed contracts which provide that hereafter tires will be manufactured in Poland under the supervision and according to the specifications of General Tire engineers, it was announced by William O'Neil, General president. A corps of General Tire engineers left Akron late in October for Poznan where they will remain some time. Part of the General Tire engineering staff will be transferred to Poland permanently. The Stomil plant, in operation about 11 years, is now producing approximately 300 tires a day, according to Joseph Andreoli, vice president and general manager of the General Tire & Rubber Export Co. Dr. Jan Piotrowski is head of Stomil, the principal source of supply for tires for the Polish army and the Polish government. Its volume of production of bicycle tires is large. Present plans provide that the output of General-built tires in the Stomil plant shall be limited to the trade in Poland alone although it is possible that other European markets may later be supplied from the plant in Poznan, Mr. Andreoli said, on account of the difference in manufacturing costs.

A. W. Steudel

The Sherwin-Williams Co., paint and varnish manufacturer, Cleveland, through President George A. Martin has announced the following organization changes effective October 1. H. D. Whittlesey, first vice president and director of sales and distribution, was relieved of the duties of director of sales and distribution and will devote his time to executive duties and to the further interests of the firm's allied connections. Vice President A. W. Steudel became vice president and general manager of the company. K. H. Wood was made director of sales and distribution. Mr. Whittlesey has served the company nearly 50 years. He spent seventeen in charge of the eastern business at Newark, N. J., and returned to Cleveland in 1918 in charge of all sales. Mr. Steudel has wide experience in practically all the operating and executive branches of the business, particularly in industrial sales, dyes, chemicals, pigments, and colors. Mr. Wood has had territorial and division sales experience and for several years was in charge of railway and marine sales. The changes are in line with the company's policy of advancing the younger men who have proved themselves, to positions of greater responsibility; thus enabling Mr. Martin and Mr. Whittlesey to devote their time to purely executive and organization matters and policies.

Goodrich Notes

The B. F. Goodrich Co., Akron, has announced that G. J. Irwin, formerly assistant engineer of tests, Bureau of Tests, Ohio Department of Highways, has joined its machine and process development departments and will be in charge of the company's highway products engineering. Mr. Irwin, for seven years with the Portland Cement Association in Pittsburgh, Pa., before joining the Ohio highway department, is a graduate of Dennison University. According to C. W. Leguillon, manager of Goodrich machine and process development, Mr. Irwin will devote his efforts to the engineering and introduction of new Goodrich expansion joints and bridge materials.

By unanimous vote about 3,000 members of the B. F. Goodrich local of the United Rubber Workers Union on September 24 decided to return to work on the terms arranged at a meeting of union officers and spokesmen for the management.

C. B. O'Connor, Goodrich general tire sales manager, has announced the appointment of three new district managers. J. E. Powers, Newark district manager for ten years, has been named manager of the New York district in place of S. R. Milburn, assigned to other duties. E. P. Weckesser succeeds Mr. Powers as Newark district manager. R. J. Devereaux has been named Buffalo district manager, succeeding N. H. Keeling, assigned to other duties. Mr. Powers joined Goodrich in Buffalo in 1910. Mr. Weckesser entered the rubber industry in 1916, with the Miller Rubber Co., Inc. He held a variety of service and sales executive posts with the company, was chairman of the service managers committee of The Rubber Manufacturers Association, Inc., for one year, and manager of automobile tire sales when Goodrich and Miller united. Previous to his present appointment he had been a staff assistant to W. C. Behoteguy, manager of the automobile tire department. Mr. Devereaux has been with Goodrich since 1914, in tire sales since 1917. He was Cleveland district manager from 1929 to 1936, was on special sales assignments prior to his present appointment.

Labor Trouble Settlement

L. L. Callahan, president of the local, told the members that the plant would reopen as quickly as possible so that the 10,000 employes idle for forty-eight hours might return to their places. He indicated that the union was not in a position to make an issue of the "sit-down" strike caused by the refusal of fourteen men in the braided hose department to tolerate the presence of a non-union pipe fitter.

It was understood that the management, represented by T. G. Graham, made no concessions as to this grievance and continued to insist that all grievances must be routed through the orderly procedure heretofore established. The management agreed to expedite the adjustment of grievances and the union agreed to educate its committeemen on the procedure to be followed.

In pleading for acceptance of the agreement, which had been worked out after two days of conference, Mr. Callahan said that the alternative would be to strike for the closed shop, which he termed "too dangerous." Mr. Callahan said that 400 grievances had already been adjusted this year and that unauthorized action of individuals in seeking to force adjustments through

(*Continued on page* 63)

EASTERN AND SOUTHERN

INDUSTRIAL movements continue steady throughout the nation. Steel mill activity has held around 76% of capacity, with trade sources indicating an unusually high volume of unfilled orders. Trends of production of electric power, coal, and lumber have all continued upward. Output of manufactures and chemicals also expanded from the already high August level. Further increase in production schedules were reported in manufacturing centers as plants received automobile parts orders in larger volume as producers prepared to push the output of 1937 models.

With stores preparing for what promises to be the best Christmas season in years, buying moved rapidly in most leading wholesale markets, and recorders for seasonal lines raised manufacturers' sales figures substantially.

Loadings of revenue freight for the week ended September 26 totaled 807,070 cars, the Association of American Railroads announced. This was an increase of 177,135 cars, or 28.1%, compared with the corresponding week in 1935 and an increase of 160,986 cars, or 24.9% above the same week in 1934. For the week of September 26 loadings of revenue freight increased by 17,560 cars, or 2.2%, above the preceding week.

In the South automobiles and accessories are among the most brisk lines. Cotton picking, moreover, is in full swing, and farmers sell the staple as fast as it is ginned. Fair weather has stimulated building; while textile mills show marked improvement. In short, industrial activity is increasing in all centers.

U. S. Rubber News

Marking a new milestone in the production of "U.S." tires, the Detroit, Mich., factory on September 25 turned out its 50,000,000th tire of Tempered Rubber. This tire, a U.S. Royal Master, was the 120,000,000th produced by U. S. since the company built the first pneumatic auto tire for Duryea in 1894. In the accompanying illustration L. D. Tompkins, general manager tire division, and F. B. Davis, Jr., president United States Rubber Co., 1790 Broadway, New York, N. Y., are inspecting the tire on a de-skidding machine, a new device which gives extra anti-skid quality.

President Davis in a recent letter to the committee devoted to rehabilitating Bristol, R. I., industrially spiked the rumor prevalent several months in the town that U. S. Rubber contemplated production of footwear there.

Dr. H. H. Harkins, development department, and O. S. True, manager, chemical industries tank lining sales, both of United States Rubber Products, Inc., will be the chief speakers at a meeting to be held by the Hartford Branch of the American Electroplaters' Society at State Trade School, Hartford, Conn., November 9. The subject of the meeting is rubber as applied to the plating industry.

L. D. Tompkins and F. B. Davis, Jr., Inspecting the 50,000,000th U. S. Tempered Rubber Tire

Engineers' Council for Professional Development, 29 West 39th St., New York, N. Y., reelected Charles F. Scott, professor emeritus of electrical engineering at Yale University, chairman at its fourth annual meeting in New York on October 6. H. H. Henline, national secretary, American Institute of Electrical Engineers, was elected secretary of the council. The by-laws were amended to provide for a vice chairman and assistant secretary; and R. I. Rees, assistant vice president, American Telephone & Telegraph Co., was elected vice chairman, and C. E. Davies, secretary, The American Society of Mechanical Engineers, was elected assistant secretary. Chairmen of the council's committees were elected as follows: Student Selection and Guidance, Robert L. Sackett, dean of engineering, Pennsylvania State College; Engineering Schools, Karl T. Compton, president, Massachusetts Institute of Technology; Professional Training, R. I. Rees; Professional Recognition, Conrad N. Lauer, president, Philadelphia Gas Works; Ways and Means, Mr. Rees; and Information, H. C. Parmelee, editorial director *Engineering and Mining Journal.* Executive committee members elected were: J. P. H. Perry (ASCE), F. M. Becket (AIME), C. F. Hirshfeld (ASME), L. W. W. Morrow (AIEE), H. C. Parmelee AICh.E), R. I. Rees (SPEE), D. B. Steinman (NCSBEE). Besides election of officers and chairmen of committees, reports of the council's committees were presented. Interest centered around the report of the Committee on Engineering Schools, and formal action on the accrediting of engineering curricula of educational institutions in New England and Middle Atlantic states was taken. The Engineers' Council for Professional Development is a conference of engineering bodies organized to enhance the professional status of the engineer through the cooperative support of the national organizations directly representing the professional, technical, educational, and legislative phases of the engineer's life. The participating bodies are American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, The American Society of Mechanical Engineers, American Institute of Electrical Engineers, American Institute of Chemical Engineers, Society for the Promotion of Engineering Education, and National Council of State Boards of Engineering Examiners.

O'Sullivan Rubber Co., Winchester, Va., according to Roy P. Funkhouser, vice president and treasurer, effective October 15 increased wages 5% for the 500 workers at its local plant and the 125 at Gettysburg, Pa.

L. J. Venuto, of Binney & Smith Co., 41 E. 42nd St., New York, N. Y., the guest speaker at the September meeting of the Philadelphia Paint & Varnish Production Club, gave an instructive talk on the manufacture and use of carbon black pigments in the protective coating industry.

Premium Exhibit

The second annual Atlantic Coast Premium Buyers' Exposition was held at Hotel Astor, New York, N. Y., September 28 to October 2 under the auspices of Premium Advertising Association of America, Inc. Rubber goods manufacturers with exhibits follow.

Barr Rubber Products Co., Sandusky, O., displayed toy balloons, sponge rubber, return, paddle, and gas inflated balls, toy automobiles, animal toys, jackstone sets, and toys for dogs. In attendance were A. D. Benedict, Robert Frissell, Mae Fisher, R. J. Dorn, Wm. J. Canary, and F. M. Sichel.

Eagle Pencil Co., 703 E. 13th St., New York, at its stand showed pencils and pens. Representing the company were Mr. and Mrs. S. H. Engelberg, Henry Maedel, Leo Solinger, and M. W. Peters.

Eberhard Faber Pencil Co., 37 Greenpoint Ave., Brooklyn, N. Y., featured pencils, penholders, rubber bands, and erasers. Present for the firm were W. J. Crangle and L. M. Brown.

The Oak Rubber Co., Ravenna, O., exhibited toy balloons and rubber novelties. Greeting the trade were Walter J. Leatherow and Paul E. Collette.

The Pioneer Rubber Co., Willard, O., displayed toy balloons, rubber gloves, and other rubber products. Company representatives follow: J. C. Gibson and H. B. and A. A. Burnstine.

Snapon Rubber Shoe Co., Watertown, Mass., featured Snapon sandals for rainy weather. In attendance were W. J. and L. L. Bennett and C. J. Estabrook.

Foster D. Snell, Inc., 305 Washington St., Brooklyn, N. Y., has opened a branch, including office and laboratory, at 215 N. Calvert St., Baltimore, Md., under the direction of Theodore M. Miller who, because of residence in Baltimore, is familiar with business conditions and methods there. He has been employed for some time in the firm's Brooklyn laboratories. The new laboratory is equipped to carry on work of the same quality as the parent organization. Every form of chemical service is to be rendered by the Baltimore branch by close liaison with the Brooklyn laboratories. The main activities are expected to be food analysis and grading, food research, and industrial and research services to manufacturers in Baltimore and vicinity.

E. A. Van Valkenburgh has been working for the past few months with Foster D. Snell, Inc., as a special consultant on rubber problems.

Foster Dee Snell addressed the Association of Textile Laboratories and Technologists on October 7 at the Hotel Wolcott, New York, N. Y., on "Some Factors in Detergency."

Federal Trade Commission, Washington, D. C., has issued an order to cease and desist false and misleading advertising to Neway Mfg. Co., Chicago, Ill., engaged in manufacturing latex bandages designated "Neway Latex Bandages," directed to discontinue representing that the product is the safest bandage known, that it is porous and water-resistant, and that it will take the place of ankle braces, corn and bunion devices, and arch supports, and to discontinue misrepresenting the probable earnings of agents.

The commission in September also made public 66 stipulations to cease and desist from unfair representations in the sale of products. Among the 66 were the following rubber companies dealing in the commodities named: Goodrich Raincoat Co., Des Moines, Iowa, raincoats; International Latex Corp., Rochester, N. Y., bathing caps, pad shields, crib sheets, etc.

Commodity Exchange, Inc., 81 Broad St., New York, N. Y., on October 14 elected Harold L. Bache, of J. S. Bache & Co., 42 Broadway, New York, vice president to head the commission-house group, to succeed J. Chester Cuppia, of E. A. Pierce & Co., 40 Wall St., New York. Mr. Bache also becomes a member of the executive committee of the exchange as a result of this election. Mr. Cuppia is retiring from his many activities to recover more quickly from a recent illness. His resignation was accepted with regret by the governors of the exchange, who presented him with an engrossed copy of a resolution recognizing his services to the exchange. He was a founder and director of all the exchanges that were merged in 1933 to form the present Commodity Exchange and has been a director of the latter since its inception.

Blackstone Studios

Harold L. Bache

Martin Rubber Co., Inc., Long Island City, N. Y., which recently purchased a plant at Long Branch, N. J., is preparing plans for a new addition and equipment to cost $40,000.

Society of Chemical Industry, American Section, recently announced the award of medals to two chemists, Dr. Walter S. Landis, vice president of the American Cyanamid Co., 30 Rockefeller Plaza, New York, N. Y., and Thomas Midgley, Jr., vice president of the Ethyl Gasoline Corp., 135 E. 42nd St., New York. At a joint meeting of the Chemists' Club and the American Chemical Society, November 6, Dr. Landis will receive the Chemical Industry Medal for 1936, "for valuable application of research to the chemistry and economics of the fertilizer industries." Mr. Midgley, at a meeting of the same groups, January 8, will receive the William H. Perkin Medal for 1937 "for distinguished work in applied chemistry, including the development of anti-knock motor fuels and safe refrigerants."

Dispersed Sulphur No. 2

Dispersed Sulphur No. 2 is a concentrated dispersion containing very finely divided sulphur, water, and a dispersing agent. It is suitable for adding directly to latex and dispersions of crude or reclaimed rubber or for incorporating into dispersions of other compounding ingredients.

Walter Grote, United Carbon Co., Charleston, W. Va., arrived September 28 in New York, N. Y., from a several months' business trip in Europe where he visited Italy, Austria, Germany, Belgium, France, and England. Mr. Grote had planned to visit Spain also, but internal disorders there made this inadvisable.

Vulcanized Rubber Co., Morrisville, Pa., finds hard rubber production increasing with many new orders coming in. The company now operates with two shifts.

Hohwieler Rubber Co., Morrisville, Pa., reports that orders have shown a large increase since last month. The firm is running at capacity.

The 1936 National Automobile Show will be held on four floors of the Grand Central Palace, New York, N. Y., November 11 to 18. The keynote of the exhibit will be symbolized by a huge allegorical figure at the grand staircase, "Pacemaker for American Industry." Another feature of the show will be a scene, on the fourth floor, depicting the great outdoors where trailers will be glorified. Alfred Reeves is manager of this automobile show.

Carl L. Reed, export manager, Kelly-Springfield Tire Co., Cumberland, Md., recently returned from a business trip through the Near East, stated that despite current political disorders in Palestine the course of ordinary business in that section of the globe has not been seriously disturbed. Mr. Reed further declared a large part of the business of Kelly distributers and others interested in European exports is still concerned with problems of quotas, import permits, and exchange control although recent agreements on monetary exchange and tariffs should serve to alleviate the situation. Mr. Reed expects soon to leave on another business trip which will take him through South America.

Raymond Keables, who recently retired as vice president of Wirt & Knox Mfg. Co., 2300 W. York St., Philadelphia, Pa., was seriously injured on September 26 when he fell from his apartment window.

Fenner & Beane, member of leading exchanges, 67 Broad St., New York, N. Y., recently announced that the office of R. E. Flowerree & Co., Jackson, Miss., has become one of its branch offices.

Lee Tire & Rubber Co., Conshohocken, Pa., on September 22 celebrated its fifty-third birthday. Present officers of the concern founded by the late J. Elwood Lee, are John J. Watson, president; A. A. Garthwaite, vice president and general manager; W. W. Benner, vice president in charge of production. Lee sales, it is reported, have doubled themselves during the last four years. The company also operates another factory at Youngstown, O.

NEW JERSEY

NEW JERSEY manufacturers, elated over present business conditions, report from present indications it will be a good winter season. The presidential election year has had no effect upon orders as was the case in past years. While the output of some goods declined during the summer, the demand for all lines is exceptionally good. Advanced prices of chemicals resulted in manufacturers making larger purchases before a further increase.

Jos. Stokes Rubber Co., at both its Trenton and Canadian plants, is running full blast with three shifts of employes. Milton H. Martindell, vice president and treasurer, recently returned from a week in Canada.

Thiokol Corp., Yardville, through Dr. Joseph C. Patrick, vice president, announced: "Our business is very satisfactory, and we have a good volume of orders."

Pierce-Roberts Rubber Co., Trenton, is now operating 24 hours a day, with good prospects for an early winter season.

The Independent Tire Dealers, comprising the majority of tire dealers in Trenton, recently organized at a dinner-meeting, has become affiliated with the National Association of Tire Dealers. The following officers were elected: president, George Yosco, Capitol Tire Co.; vice president, Samuel Fineburg, Fineburg's Tire & Accessory Co.; secretary-treasurer, Daniel Volk, Volk Tire Co. At the dinner George Burger, secretary and general manager of the National Association, was the guest speaker. The association went on record as opposing the placing of a spare tire on new cars by manufacturers. Dealers were informed that better business was expected through the enactment of the Robinson-Patman Act prohibiting price fixing.

The Flintkote Co., Rutherford, is spending $2,000,000 on plant expansion, one-half to be for a felt and boxboard mill in Los Angeles. A $750,000 asbestos plant and additional manufacturing facilities for automotive products will be built at Rutherford and an asbestos plant at Chicago Heights, Ill., is nearing completion.

Pocono Co., Trenton, finds business holding up very well.

Whitehead Bros. Rubber Co., Trenton, continues to operate 24 hours a day with a better demand for rubber footwear.

Acme Rubber Mfg. Co., Trenton, announced that September and October showed a better production than similar months of the past several years. One official said, "We find our business greatly increased and expect it to remain so."

Address on Meteorological Balloons

A meeting of the Plainfield Section of the American Association of Mechanical Engineers was held in the ballroom of the Elizabeth-Carteret Hotel, Elizabeth, N. J., the evening of October 15. About 100 members and guests, including a number of ladies interested in engineering subjects, attended and were instructively entertained by Mason T. Rogers, head of sales research, Dewey & Almy Chemical Co., Cambridge B, Mass., whose subject was "Up in the Air."

Surrounded with a spectacular display of the new meteorological rubber balloons developed from Kaysam by A. P. Rehbock, Dewey & Almy scientist, Mr. Rogers traced the history of progress of the methods employed by meteorologists in their studies of aerology, also the benefits to the comfort and safety of mankind resulting from the too little publicized efforts of these weather scientists. From the stage of kites and manned balloons through that of free ballooning with recording devices to the systematic airplane observation method now employed he revealed the dangers, discouragement, and prohibitive expense that have limited the study of atmospheric conditions at high altitudes which determine the conditions later prevailing at living levels. Mr. Rogers detailed the far-reaching significance of two recent developments, the radio meteorograph and its unique carrier, the latex balloon. These developments are not reported here as they are treated elsewhere in this issue in an article "Getting Ahead of the Weather," also by Mr. Rogers.

The unusualness of this subject was evidenced by the interest shown by those present in the examination of the exhibition balloons, ranging in size by degrees of inflation from about 16 inches in diameter to that of approximately 12 feet to which was attached a manometer showing only ¼-inch water displacement.

Essex Rubber Co. reorganization plan was completed October 7 in the Federal Court at Trenton with the receipt of a loan of $250,000 from the Reconstruction Finance Corp., and the payment of all debts to creditors. The firm, according to officials, is now in excellent shape and employs 475 persons. Business is increasing, it was stated. Essex went into a receivership in July, 1931, and was operated by Harold S. Maddock, appointed by Federal Judge Forman. He remained in charge until March 14 last when a petition for reorganization under the National Bankruptcy Act was entered. Mr. Maddock and Joseph F. O'Shaughnessy were named trustees and are still functioning in that capacity. The latter was elected president of the firm. In April the firm requested a loan from the R.F.C. in order to meet obligations. The creditors approved the plan.

Luzerne Rubber Co., Trenton, has awarded a contract for a one-story brick factory addition. President Bruce Bedford has been made chairman of the Trenton Community Chest campaign. Mr. Bedford recently returned from an extended cruise with his family.

The Thermoid Co. stockholders at a special meeting in Trenton on September 27, through 65% of the common stockholders and 80% of the preferred stockholders, approved the recapitalization plan submitted them. Details of this plan are given on page 64 of our October issue.

Michelin Tire Co. plant, Milltown, N. J., idle for several years, may be acquired by a Detroit, Mich., industrial concern, according to the Milltown Chamber of Commerce.

Atlantic Deeper Waterways Association last month held its twenty-ninth annual convention at Trenton. Among the exhibitors were Cresent Insulated Wire & Cable Co., John A. Roebling's Sons Co., New Jersey Wire Cloth Co., Jos. Stokes Rubber Co., Vulcanized Rubber Co., Luzerne Rubber Co., Mercer Rubber Co., Puritan Rubber Mfg. Co., and The Thermoid Co.

OHIO

(*Continued from page 60*)

"sit-down" strikes would handicap the union in its desire for harmonious cooperation with the employers.

Ohio Rubber Co., Willoughby, last month started work on two new buildings, both of brick and steel to cost about $20,000. One is the extension of the main factory to be 20 feet wide, 360 feet long, and 20 feet high; the other, a new stock room at the rear, will be 50 by 75 feet and 20 feet high. The plant's water tower will be removed to make room for the latter structure.

Cascade Rubber Co. soon will start operations at 2051 Water St., Cuyahoga Falls, manufacturing tire repair materials including camel-backs. Later the firm will make mechanical rubber goods. According to Secretary-Treasurer P. C. Pearce, the company is a small one with not many employes, but hopes to expand in the near future. Mr. Pearce formerly was with the India Tire & Rubber Co. and The General Tire & Rubber Co., both of Akron. W. J. Lerch, at one time with the Falls Rubber Co., Cuyahoga Falls, is president of the new concern.

MIDWEST

SEPTEMBER closed the 1936-model year, with production down sharply from the August total of 271,000 units which, in turn, was below that of July by more than the estimated seasonal amount. September production approximated 115,000 units, the low of the year, with a sharp rise in October.

Total production for the automotive year, October to September, inclusive, was about 4,400,000 units, an exceptionally good showing. The total for the calendar year 1936 may exceed this figure since production schedules for the fourth quarter indicate an output exceeding the more than a million cars produced in the final quarter of 1935.

Stocks of 1936 models held by dealers are low and will be cleared before the new models are available. One leading producer operated assembly lines at a relatively high rate into the latter half of September to meet dealer requirements for 1936 models. Most concerns ceased assemblies, however, before September. Considerable outlays are being made by the major companies to improve, expand, and integrate their production facilities.

Retail sales of new passenger vehicles have declined during August and September in accord with the usual pattern and, despite the drop in the seasonally adjusted index since July, the current demand augurs well for the start of the new-model season. August passenger car sales were the best for the month since 1929; while sales of commercial vehicles topped the previous record for that month.

In the St. Louis district the industrial field shows every evidence of continued advances. Plants making structural steel and railway equipment are operating at near capacity. Shoe plants are speeding up, as are small industries; while employment is slowly increasing.

Ford Tire Plant

The Ford Motor Co.'s plans for its own tire plant at Detroit, Mich., to relieve the company of its present dependency upon tire manufacturers in the strife-torn Akron area are reported to be going ahead steadily. While the Ford company has received estimates from practically all tire mold and equipment makers on approximately $10,000,000 worth of modern tire and tube building equipment, it is reliably understood that few, if any, of these manufacturers can promise delivery for many months as all are loaded up with orders of Akron tire manufacturers who are decentralizing and increasing their production facilities outside of Akron.

Until such time as Ford can get a full complement of machinery and equipment it is understood the company will utilize its own equipment used in several departments of its factories, including calenders, tubing machines, vulcanizers, etc., for making such parts as steering wheels. For the time being at least, it is reported, the company will use its present forge shop for tire building purposes. This four-story building has floor space of between 160,000 and 200,000 square feet.

Expert tire designers are said to be at work on designs for the new Ford tire which will eventually become universal standard equipment on all Ford cars, replacing Firestone, Goodyear, Goodrich, and U. S. tires now used. The report that several technical experts and tire design experts from the Firestone Tire & Rubber Co. were working on the new Ford tire plants has given rise to much speculation as to whether the Ford tire building move is purely a Ford move or possibly a veiled aspect of a Firestone decentralization program. It is recalled that while other major Akron tire manufacturers have announced decentralization programs and have acquired production facilities outside of Akron, Firestone has remained silent and apparently inactive so far as decentralization is concerned. Automotive observers also recall the close personal friendship that has existed for years between Henry Ford and Harvey Firestone and find it difficult to believe that Ford would divorce himself abruptly and completely from the tire company which has supplied more than half of all Ford original equipment tires.

Ford's requirements this year will approximate 5,000,000 casings. The specifications issued for bids from equipment manufacturers, it is understood, called for equipment sufficient to produce 24,000 tires per day on a basis of three eight-hour shifts.

Akron tire company observers say that in view of the heavy orders booked by equipment manufacturers, it would probably be two or three years before Ford could get enough new equipment to produce up to 24,000 tires daily.—*Automotive Industries.*

Safety Awards

National Safety Council, 20 N. Wacker Dr., Chicago, Ill., on October 6 announced the winners in the Rubber Section Annual Safety Contest at the twenty-fifth National Safety Congress and Exposition held in Atlantic City, N. J., October 5 to 9. Bronze plaques were given first-place winners and certificates for second and third honors. Thirty-five rubber companies and units participated, representing 49,652,116 man-hours worked by 53,646 employes.

Awards were made for the lowest frequency rates (number of disabling injuries per one million man-hours worked). The average frequency rate for the 1936 contest was 6.465, a 3% increase over the 1935 contest rate. Twenty of the units completed the contest with a frequency rate below the average, and seven units went through the half-year contest, from January 1 to June 30, 1936, without a single lost-time accident.

Where two or more contestants tied for first place in any group without a disabling injury, this perfect record resulted in equal rankings and awards. A disabling injury was defined by contest rules as any injury arising out of and in the course of employment, resulting in death, permanent total disability, permanent partial disability, or temporary disability. Under the rules injuries were classed as those accidents in which the victim was unable to return to work at the beginning of the next day following the mishap.

There were two groups in the contest. Winners in the first "Rubber Products," group, representing over 125,000 average monthly man-hour exposure, were: first, United States Rubber Products, Inc., Providence Plant, Providence, R. I.; second, Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.; third, Samson Tire & Rubber Corp., Los Angeles, Calif.

The second group was confined to those companies having under 125,000 average monthly man-hour exposure. Six companies, with perfect records, tied for first place. The list follows: Dominion Rubber Co., Ltd., Papineau Factory, Montreal, P. Q., Canada; Van Cleef Bros., Chicago, Ill.; U. S. Rubber Products, Development Department, Passaic, N. J.; Lobl Mfg. Co., Middleboro, Mass.; Fabric Fire Hose Co., Sandy Hook, Conn.; U. S. Rubber Products, Mechanical Fabric Division, Providence.

New Publications

(*Continued from page* 58)

"Chemicals by Glyco." The Glyco Products Co., Inc., 148 Lafayette St., New York, N. Y., contains a number of interesting additions, in particular, the special formulae section where suggested formulae are given of interest to many different industries including rubber.

"Program of Papers." The West of England Section of The Institution of the Rubber Industry, London, England, has issued a vest-pocket booklet listing the various sections of the I.R.I. and their respective officers; summary of members, regulations, etc.; and program of papers, session of 1936-1937. The titles of papers planned are most interesting and timely. Among them are several featuring psychological topics having important bearing on success in plant management, progress, and sales.

NEW ENGLAND

NEARLY all reports on business in New England continue good. Cotton manufacturers are doing a much-improved business, and prices are firm. Shoe manufacturers have had a particularly good run and are still receiving a substantial volume of repeat orders. On the basis of the performance for the first nine months it is practically certain 1936 will be the best year in the history for shoe production.

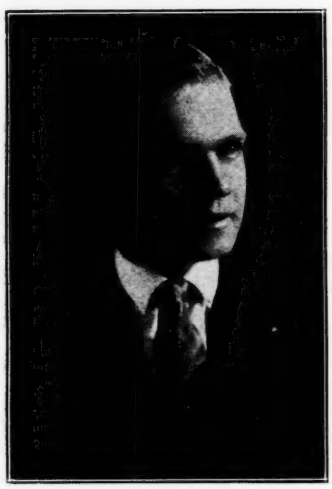
New building operations continue to hold up surprisingly well for this season. Most paper mills are doing better. Manufacturers of electric equipment, chemicals, various kinds of machinery and metal goods continue to operate at the high rate of recent months.

Head Chemist

Lawrence D. Walker, head chemist in charge of rubber and laboratories for Collyer Insulated Wire Co. and Providence Insulated Wire Co., both of Pawtucket, R. I., has held this responsible position since 1928. His previous business connections follow: Boston Woven Hose & Rubber Co., 1922-23; Merrimac Chemical Co., 1923-24; Barret Co., 1924-25; Underwriters Laboratories, 1925-26; and American Steel & Wire Co., 1926-28.

Mr. Walker was born in Cambridge, Mass., December 2, 1898. He was educated at grade schools, Watertown High School, and Northeastern University, where he majored in chemical engineering and received the degree of B.Ch.E. in 1924.

He belongs to Victory Lodge, A.F. & A.M., American Chemical Society and Boston Group of its Rubber Division, and the Rhode Island Rubber Club, of which he is a past secretary-treasurer and past president and a member of the present executive board.



Lawrence D. Walker

Arnold R. Davis

Davis in New Post

Arnold R. Davis, superintendent of the heel and sole plant, United States Rubber Products, Inc., Providence, R. I., since February 1, 1936, resigned October 1 to become chemist in charge of the rubber section of the technical service laboratory of American Cyanamid Co. on Boston Post Rd., Stamford, Conn.

Mr. Davis was born in Montville, Me., October 31, 1900. He attended Milford High School, Milford, Mass., (1914-1918), and Massachusetts Institute of Technology, graduating in 1921 with a B.S. degree in chemical engineering.

In February, 1922, he became assistant chemist of the Firestone Footwear Co., Hudson, Mass., and in September, 1924, was made chief chemist, which position he held until joining U. S. Rubber. While at Firestone, Mr. Davis was in charge of plant control and chemical development work in the manufacture of rubber footwear, heels, and cements.

Mr. Davis belongs to the American Chemical Society and the Masons.

His home address is 8 Ferris Dr., Greenwich Gardens, Old Greenwich, Conn.

The Bristol Co., Waterbury, Conn., has appointed four graduate engineers to its field service organization. These men recently completed a two-month training course at the Waterbury factory under the supervision of F. A. Faust, sales research engineer, and G. T. Evans, general staff engineer. The newly appointed men follow. E. H. Hart, service engineer, assigned to the Boston office, Consolidated Building, is a graduate of Geneva College, where he received a B.S. degree. He also attended the University of Pittsburgh and secured considerable industrial experience in the Pittsburgh section. J. N. Swarr, service engineer, assigned to the company's New York office, 220 E. 42nd St., replaces Mr. Evans, promoted to the engineering department at Waterbury. Mr. Swarr graduated from Purdue University with a B.S. in electrical engineering. He has had much miscellaneous manufacturing and plant experience. K. J. Platt, service engineer, assigned to the Philadelphia office, Market St. National Bank Building, received B.S. and M.S. degrees in chemical engineering from Queens University. He spent several years after graduation with the Canadian packers doing engineering work. R. A. Barnes, service engineer, assigned to the company's St. Louis office, Boatmen's Bank Building, is a graduate mechanical engineer from Purdue and also took courses in petroleum engineering at the University of Oklahoma and has had refinery experience.

Superintendent

Charles Berlow, rubber superintendent and chemist, was born in Boston, Mass., July 17, 1897. He obtained his chemical education at Northeastern University, Boston, when he graduated in June, 1919, in chemical engineering with the degree B.Ch.E. From 1919 to 1924 he was chemist in the laboratory of the late Dr. Lothar F. Weber, Boston. He spent a year (1924 to 1925) in the plant laboratory of Fisk Rubber Co., Chicopee Falls, Mass., advancing then to the American Wringer Co., Woonsocket, R. I., where he was chemist of the plant from 1925 to 1931. From 1927 to 1931 he served as instructor of chemistry at Woonsocket Evening High School. From 1931 to the present he has been superintendent of the American Wringer Co. He originated and developed the manufacture of

(*Continued on page 66*)

Charles Berlow

OBITUARY

J. F. Cooley

JOHN FAY COOLEY, for 22 years storekeeper of the Vulcanized Rubber Co., Morrisville, Pa., died September 25 after a brief illness. He was a member of the Morrisville Chamber of Commerce. Surviving are his wife and three daughters. Interment was at Yardley, Pa.

G. W. Howell

GERALD W. HOWELL, 34, who died suddenly September 25, had resigned recently as shipping foreman of the Puritan Rubber Co., Trenton, because of ill health. He leaves his wife, two daughters, and two sons. Burial was in Memorial Park Cemetery, Trenton.

Ernest A. Hallweg

ERNEST A. HALLWEG, who died October 15 at College Point, L. I., where he was born 76 years ago, had retired from the American Hard Rubber Co. in 1927 after 56 years of service. He was also the organizer and for many years leader of Hallweg's Band. He leaves five sons.

Emmett A. Joline

EMMETT A. JOLINE, 64, vice president of the S. S. White Dental Mfg. Co., died October 4 of acute indigestion at Philadelphia, Pa.

Gordon L. Naylor

GORDON L. NAYLOR, assistant treasurer of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., died suddenly on October 8 at his home in Wilmington. He was 53 years old.

Julia C. Colt

MRS. JAMES BENNET COLT, adopted daughter of the late Charles Goodyear, who first vulcanized rubber, died October 11 in Monterey, Mass. Her age was 94.

B. A. Stewart

BERT ALEXANDER STEWART, long prominent in the stamping device industry, died after a long illness from a heart ailment on September 23 at his home in Newton, N. J. Mr. Stewart was president of R. A. Stewart & Co., Inc., New York, N. Y., Hill-Independent Mfg. Co., Philadelphia, Pa., Fulton Specialty Co., Elizabeth, N. J., and the Newton Theatre Co., and was also a director of the Superior Type Mfg. Co., Chicago, Ill., and of many other rubber stamp concerns. He was born in New York 47 years ago.

He leaves a wife.

Masonic services were held September 25, and church services September 26. Interment was in Woodlawn Cemetery, New York.

Theodore W. Bassett

ON OCTOBER 8, Theodore Wells Bassett, 67, who retired fifteen years ago as president of U. S. Rubber Reclaiming Co., Inc., 500 Fifth Ave., New York, N. Y., of which his father was one of the organizers, died at his home in Rye, N. Y. The deceased was also founder of the Bassett Corset Co., Derby, Conn., and once owned a rolling mill in Wyoming. He belonged to the New York Athletic Club.

His wife and a son survive.

Funeral services were held October 10. Burial was in Derby.

NEW ENGLAND

(*Continued from page* 65)

"Tensilastic" rubber and patented several inventions on rubber rolls, etc.

He is a member of the American Chemical Society, Division of Rubber Chemistry; Morning Star Lodge 13, F. & A. M.; a member of the executive board of the Rhode Island Rubber Club (Executive Committee). His business address is superintendent and chief chemist, American Wringer Co., 91 Social St., Woonsocket, R. I.; his home, 25 Trent St., Woonsocket.

Fisk Rubber Corp., Chicopee Falls, Mass., according to Col. Chas. E. Speaks, president since late June, this year has escaped the usual autumn dip in production. The plant, which continues to maintain a good production level and expects no drop this year, now makes about 8,000 tires daily, a 2,000 gain from the low level of June. This new business was vital to the existence of Fisk, Colonel Speaks holds. Sears Roebuck & Co., Chicago, Ill., has given Fisk another small order of about 100,000 tires, but negotiations are under way for one of the large orders the mail-order house will give out in the next few months. No dividend was declared by Fisk at the end of the third quarter because the firm felt that what little money it had should be kept for purchases of materials. In the firm's present financial condition any borrowing is to be avoided.

C. E. Maynard, Fisk factory manager, announced on October 22 a wage increase of 11%, operative November 2. The increase affects 1,943 employes, and, it is said, will increase the payroll $250,000 a year. The employes had asked the company for a wage conference on November 2.

American Wringer Co. has awarded a contract for the erection of a one-story brick roller room on Pond St., Woonsocket, R. I., to be 28 by 50 feet with an ell 14 by 25 feet of mill construction with a flat roof. The estimated cost is $4,000.

(*Continued on page* 68)

FINANCIAL[1]

Baldwin Rubber Co., Pontiac, Mich. Nine months ended September 30: net profit after federal income taxes and other charges, but before provision for federal surtax on undistributed profits, $301,706, equal to $1.08 each on 278,604 $1 par capital shares. Net profit for September quarter was $56,643, or 20¢ a share.

Boston Woven Hose & Rubber Co., Cambridge, Mass. Year ended September 1: net income, $217,251, equal after preferred dividends to $2 a share on 86,000 common shares, compared with $82,407, or 43¢ a common share in the year ended August 31, 1935.

Dayton Rubber Mfg. Co., Dayton, O. Ten months ended August 31: net income, subject to audit, $357,337 after federal income taxes, interest, depreciation, and other charges, but before provision for surtax on undistributed profits, equal after dividend requirements on $2 Class A preferred stock to $1.76 a share on 156,413 common shares. In the same period last year net income was $49,798, or $1.07 a share on 46,518 shares of preferred stock. August net income $65,720 before surtax on undistributed profits compared with $6,327 in August, last year.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Quarter ended September 30: $2.04 a share on its common stock, including the dividend from its General Motors investment, amounting to $1.09 a share on du Pont common, according to the preliminary statement. This compares with total earnings of $2.06 a common share, including $1.11 a share from General Motors, in the preceding quarter. In the September quarter last year earnings were $1.48 a common share, including 68¢ from General Motors investment.

For the first nine months of this year earnings equaled $5.31 a share on the common stock, including dividends from General Motors amounting to $2.65 a share on du Pont common. In the first nine months of 1935 total earnings were $3.22 a common share, including $1.13 from the investment in General Motors.

Lee Tire & Rubber Corp., Conshohocken, Pa. Three months ended July 31: sales, $3,119,938, an increase of 48% over sales of $2,100,153 in the same period last year. Sales for the nine months ended with July were $7,220,366, against $5,805,647, in the same period a year ago, a gain of 24%.

Super Mold Corp. of California, Lodi, Calif. Eight months ended July 31: net income, $37,581, against $59,384 in year ended November 30, 1935. On October 20 San Francisco Stock Exchange admitted to trading 40,000 shares of $10 par common stock of the company.

[1] "Dividends Declared" on page 88.

Rubber Industry in Europe

GREAT BRITAIN

New Uses of Rubber

This month come reports of three new uses of rubber which appear capable of widespread service. In conjunction with a cement firm the Rubber Growers' Association for some time has been experimenting with rubber sheets for finishing concrete surfaces. The latter must often be provided with a patterned surface either for decorative purposes or to serve as a key to insure the proper adhesion of other finishing materials. While plastic, concrete readily conforms to the shape of molds, and tests have shown that designs can be impressed on concrete surface by lining the formworks with suitably patterned rubber so that the patterned surface will be next to the concrete. Since a wide field exists for reenforced concrete in building, the use of rubber would have a big future. At present, however, the cost of the sheeting is an obstacle. To be sure a sheet can be used over and over again so that where there is much repetition work, the cost would come to only a few pence per square yard; but where there is not such duplication, builders would not be able to afford it. Discussing this matter at the Rubber Flooring Conference held in connection with the Building Exhibition which was opened at Olympia in September, Mr. Keeble suggested that it might be worth while manufacturing and stocking sheets in suitable sizes and renting them out to contractors on a sale or return basis at some moderate sum at which it would pay them to hire. Samples of this sheeting were shown at the stand of the Rubber Growers' Association at the Building Exhibition.

Another new and very promising outlet for rubber is in the manufacture of boots for sheep suffering from foot rot. This disease affects the soft and horny parts of a sheep's foot and hitherto has cost breeders hundreds of thousands of pounds annually. For the remedies to cure the condition are usually rubbed off in the grass so soon after application as to be without any effect. But with the boot, which keeps the dressings in place, all normal cases of foot rot can be completely cured in a week. The sheep, it should be added, do not notice the boot at all. The boots have been tested about six months on various farms and are now produced by Dunlop at its Walton, Liverpool, factory. They are flexible and waterproof with pliable but stout soles and made to fit snugly. As they are slit part way down the front, they are easily put on, closing with zippers, snap buttons, or lace holes. They weigh about 2½ ounces each and are provided in five sizes, three of which will cover 80% of the sheep here. A special advantage is that they can be rapidly cleaned and disinfected to be used successively on other sheep.

If a recent invention in which blast furnace slag is combined with liquefied rubber is all that it is claimed to be, a serviceable and apparently inexpensive road paving material has become available. After years of research Thomas Arnold, of Bradford, has succeeded in combining liquefied rubber with double the amount of furnace slag to produce a material from which he has made not only road paving, but non-slipping boot soles, and even tires. He states that he has ridden 10,000 miles on a tire retreaded with this composition, the speed averaging 50 to 60 miles an hour, and has used soles as thin as those of leather, for seven to eight months without much sign of wear. The authorities appear impressed with the possibilities of the material for roads as a trial stretch of roadway is being paved at Shipley, a town not far from Bradford.

Notes

To combat the menace of low-priced foreign hot water bottles, which have been offering increasing competition to the home industry, a specific duty of 4s. 6d. per dozen is imposed as an alternative to the present duty of 20% ad valorem, on certain hot water bottles made wholly or partly of rubber.

The proposal of the Dunlop Rubber Co., Ltd., to purchase the remaining shares of the India Tire Co. has been approved by the shareholders concerned, and the planned absorption has become fact.

Dunlop has sold the New Eccles Rubber Works to a Salford firm of paint manufacturers.

Dunlop now offers white bathing helmets with the monogram of swimming clubs stenciled on them. The stenciling, carried out by a special metallic process, is permanent, and neither water nor rubber will efface the lettering. For swimming clubs ordering more than three dozen of these helmets at a time the monograms are put on free of charge.

A fair amount of building has been undertaken of late by firms connected with the rubber industry. The T. B. Andre Rubber Co., Ltd., is erecting a new factory and offices on the Kingston-on-Thames by-pass road, Tolworth, to cost £25,000. Dexine, Ltd., has extended its premises and is now remodeling the old factory to meet the increasing demand for its products. The Pyroterax Co. recently established to manufacture electric cables, is building a new factory at Hedgley Rd., Hebburn.

Despite difficulties caused by advancing prices of raw materials and keen competition Leyland & Birmingham Rubber Co., Ltd., reported for the year ended September 23, 1936, a profit of £99,033, which with the carry-forward from last year, comes to £117,-854. After various deductions were made, an amount of £59,290 was left, out of which a final dividend of 5% is to be paid, which with the interim dividend of 2½% makes the total distribution for the year 7½%, and £29,-290 was carried forward.

HOLLAND

The opening of the new Rubber Research Laboratories at Delft, Holland, on September 17, 1936, was the occasion of holding an extraordinary general meeting of the International Association for Rubber Cultivation in the Netherlands Indies, Amsterdam. Among those present were representatives of government officials, scientific bodies, Rubber Growers Association of London, commercial organizations, and others interested in the rubber world. The chairman, W. J. de Jonge, referred to the difficulties of the rubber industry during past years and after an explanation of the importance of rubber research, particularly in present circumstances, in which too much attention cannot be paid to consumption research, he emphasized that as a result of the rubber restriction agreement, understanding and cooperation had been reached between the various governments, the producers of various nationalities, and between the European and native producers. In this agreement he saw a change in international economic policy, an attempt to arrive at a solution by means of international cooperation instead of aggravating the burdens of everyone by a policy of tariff walls and other things. This was a matter of importance that was not confined to rubber interests. Mr. de Jonge further emphasized that it was only by international cooperation that a solution could be found for the difficulties of the rubber industry.

The chairman mentioned with pleasure the recent statement of the Minister of the Colonies that His Excellency had given his approval to the

establishment of the Rubber Institute for Research and Propaganda.

The next speaker, G. C. Denham, representing the R. G. A., congratulated the society and also emphasized the value of international cooperation. Then followed the reading of various papers: Prof. Dr. G. van Iterson, "Introductory Remarks on Research and Propaganda;" J. G. Fol, "Shipment and Distribution of Latex;" Dr. A. van Rossem, "Latex Investigations of the Research Section and Provisional Results."

A few weeks later Delft was again the scene of an important rubber meeting, when the Colloid Section of the Netherlands Chemical Society held a two-day conference. A number of well-known rubber authorities were present and several valuable papers were read on the chemistry of latex, and natural and synthetic rubbers, new views on vulcanization, new methods of treating crude rubber, applications of latex, etc.

EUROPEAN NOTES

A cartel for rubber thread has recently been formed in Prague, Czechoslovakia, to regulate the exclusive purchase and the price of rubber thread. Among the 28 firms in it are the International Rubber Thread Association, Zurich, Switzerland, which heads the cartel; A. M. Birnbaum G.m.b.H., Teplitz; Franz Gabler, Jagerndorf; Grohmann & Co., Wurbenthal; Franz Josef Hille, Gross-Schonau; Hermann Gamnitzer, Weipert; Adolf Geipel & Sohn, Fleissen.

Russia's crude rubber imports the first half of 1936 came to 18,437 tons against 18,292 tons for the corresponding period of 1935. Information circulated by the Soviet about local achievements with synthetic rubber is usually regarded with some skepticism. However the decline of crude rubber imports since 1934, when the total for the year was 47,300 tons, would indicate that Russia is indeed using considerable quantities of synthetic rubber. To be sure, as the Russians themselves admit, the quality of the synthetic rubber goods leaves much to be desired. But they are continuing their struggle to produce suitable synthetic rubber compounds and to manufacture articles of 100% synthetic. Only recently it was decided to build Synthetic Rubber Factory No. 5 at Tambow, to be completed in 1937. This factory is to have a capacity more than two times greater than the Voronezh factory. In the construction of the newer factories, roads and living quarters are being thought of first, instead of the factory, as has been the case previously. The plans now call for the construction of 25 five-story apartments; in addition there are to be a club, polyclinic, school, kindergarten, creche, gymnasium, restaurant, garage, etc.

It is further planned to start as soon as possible on the building of a factory and workmen's quarters at Vologde. This will be Synthetic Rubber Factory No. 7.

Guayule (*Parthenium argentatum*) and varieties of dandelion (*Taraxacum*) are to be planted extensively in southern Italy in an effort to make Italy independent of the most important raw materials, it is officially announced.

Fabbriche Riunite Industria Gomma, Turin, declared a 6% dividend. The capital is 30,000,000 lire.

Soc. An. Michelin Italiana, Turin, capitalized at 48,000,000 lire, recently paid a dividend of 24.60 lire on each share of 500 lire.

The An. Gomma Affini has obtained permission to enlarge its Milan works for the production of rubber goods from waste.

Aktiebolaget Varname Gummifabrik, Stockholm, Sweden, recently was formed to manufacture and deal in rubber goods. Of the share capital, which is to be not less than 800,000 kronen and not above 2,400,000 kronen, 680,000 kronen has already been paid.

During the period October 1, 1936, through September 30, 1937, up to 8,000 bicycle and tricycle tires and 4,000 inner tubes may be imported into the Irish Free State, under quota orders dated August 27, according to a report from Consul Sidney A. Belovsky.

GERMANY

Thanks to increasing motorization, German tire production has been growing steadily. The record figures of 1929 were exceeded in 1934, and latest available data show a further expansion in 1935. In that year production of tires of all kinds for motor vehicles totaled 3,491,000 against 2,772,000 in 1935, and tubes 3,222,000 against 2,724,000. Proportionately the increase was highest in the case of giant pneumatics for trucks and buses; or 60% over the 1934 figure; tires for passenger cars and delivery wagons also showed considerable development. The output of tires and tubes for cycles, however, fell heavily owing, it is said, to excessive hoarding in 1934.

The following table shows the production of the different types of tires and home and foreign sales:

	Production		Sales, 1935	
	1934	1935	Inland	Abroad
Cycle covers	22,114,000	16,776,000	14,799,000	983,000
Cycle tubes	18,657,000	14,303,000	12,802,000	776,000
Tube tires for cycles	96,000	78,000	66,000	9,000
Motorcycles and small motor vehicles:				
Covers	707,000	794,000	716,000	29,000
Tubes	704,000	744,000	703,000	12,000
Passenger cars:				
Covers	1,598,000	1,963,000	1,765,000	110,000
Tubes	1,571,000	1,793,000	1,725,000	65,000
Delivery cars:				
Covers	209,000	322,000	277,000	28,000
Tubes	194,000	279,000	247,000	15,000
Trucks and buses:				
Giant pneumatics (covers)	242,000	387,000	335,000	39,000
Tubes	239,000	364,000	322,000	26,000
Solid tires with steel rims	60,000	59,000	53,000	2,000
Carts and tractors:				
Tires	8,000	10,000	12,000	....
Tubes	8,000	9,000	10,000	....
Solid tires with steel rims	43,000	55,000	53,000	2,000
Pneumatic tires for other vehicles:				
Covers	8,000	15,000	14,000	....
Tubes	8,000	15,000	15,000	....

In addition were produced 278 tons of other solid tires against 241 tons in 1934, and 3,443 tons tire accessories and tire repair material against 2,618 tons.

The total value of the output in 1935 was 178,300,000 marks, and the sales value 170,000,000 marks, of which direct foreign sales accounted for 7,400,000 marks. The 1935 figures represent an increase of 16% over 1934 as regards value of inland sales and of 24% for foreign sales.

The tire industry included in 1935, 21 factories, 14 of which produced all kinds of tires, while of the remaining 7, 3 produced only solid tires, and 4 only tire accessories and repair material. Altogether 42,000 tons of rubber, including reclaim and synthetic, were consumed; while employment was given to 14,500 persons who received a total of 32,600,000 marks in wages and salaries.

NEW ENGLAND

(*Continued from page 66*)

E. I. Kilcup, managing executive, Davol Rubber Co., Providence, R. I., and past president of the National Association of Credit Men, has been appointed to a committee of business executives representing all parts of the United States to develop a program by which an intensive campaign can be conducted by the Association to better credits, thereby improving the nation's profits by reducing credit losses.

The Collyer Insulated Wire Co., Pawtucket, R. I., has purchased additional property on Roosevelt Ave., which includes 54,000 square feet of land and a two-story building having 60,000 square feet of floor space. Company officials announced the purchase was made "for manufacturing and warehouse purposes."

Rubber Industry in Far East

MALAYA

Planting Experiments

A good deal of valuable information regarding progress in the breeding of high-grade planting material is in the speech of Eric Macfadyen, the chairman of Prang Besar Rubber Estate, Ltd., at the annual meeting of the company. The plot (P 1) planted with seeds from crosses made in 1928 by hand pollination has now been tapped for two years. In its sixth year (1934) its yield was 649½ pounds per acre, and in its seventh 1,437½ pounds per acre. From the first plot 230 new clones were made at an early stage and these, grown under conditions designed to facilitate comparison with two of the best clones in general use, have in early tapping given yields much in excess of those of the controls. Hundreds of promising clones have also been made from later hand pollinations.

Referring to the growing popularity of legitimate seed, Mr. Macfadyen said recent results obtained at the A.V.R.O.S. Experiment Station in Sumatra were likely to give still further encouragement here. It seems that in Sumatra families of good genetic quality have at 12 or 13 years equaled the performance of their parental clones, a finding confirmed by the more limited experience at Prang Besar. The difficulties of hand pollination exclude it as a practical method except on the small scale suitable for a breeding station. However the isolated seed gardens established in Lower Perak offer a source of supply on a large scale and of somewhat comparable value.

These gardens, isolated from any other rubber by six miles of coconuts, were laid out in 1927-28 and consist of bud-grafts from nine out of the 11 clones used as parents for the families in plots P 1 and P 2 already referred to. The yields obtained from the latter (which for non-budded trees of their age are said to be remarkable) may be considered as giving some indication of what to expect from seedlings grown from the seed of the isolated gardens.

Another interesting experiment has been carried out with "selfing" clonal rubber. In this case permission was obtained from the F.M.S. Forest Department in 1930 to plant up isolated plots in one of the forest reserves, each of the plots being planted up to bud-grafts of a single clone.

Results indicate that such monoclone planting gives little promise for sources of seed supply; a marked degree of sterility was found especially among the best clones where this amounted almost to self-sterility. Commercial seed, said Mr. Macfadyen, will in the long run be obtained from mixed clones and for immediate use such a partially proved grade of seed as that from the isolated seed gardens first mentioned is the safest seed at present available.

The prohibition of new planting has affected the company's business as a nursery estate and for the second consecutive year a loss has been booked. However interest in replanting has been increasing in Malaya so that improvement is expected. Prang Besar estate as an ordinary commercial producer is also making good headway. It has 1,480 acres of mature rubber, half of which is always being rested. The yield per tapped acre of rubber of ten years old and older is at the rate of 829 pounds per acre, an increase of 32 pounds per acre as compared with 1935.

Notes

The Rubber Research Institute announces that for shipping latex new drums treated internally before assembly with a bituminous preparation approved by the institute have recently become available in Malaya. The filming preparation used in these drums does not reduce the stability of the latex, and it is effective against discoloration. The preparation is not suitable for second-hand drums.

To encourage a new use for rubber the Kinta Sanitary Board will recommend to the government that the license fee for rubber-tired bullock carts should be $1 (Straits currency) per annum as against $12 for those with iron-shod wooden wheels.

J. S. Saxby, a director of the London firm of rubber dealers, Hecht, Levis & Kahn, has been visiting Malaya to study conditions in the rubber industry. In an interview for the *Pinang Gazette* he urged the need of government protection for British merchants from Japanese competition and for the restoration of an equal competitive basis in the rubber trade. A watertight agreement putting every shipper on a basis of equality alone would prevent numerous European rubber exporters going out of business, he stated, and emphasized the necessity of immediate action to help European concerns.

INDO-CHINA

Rubber shipments from Indo-China during June, 1936, came to 2,777,286 kilos and for the first six months of the year totaled 15,573,293 kilos.

CEYLON

Unfair Quota

The feeling is growing among a considerable proportion of local rubber producers, including numbers of the more influential companies, that it should be made clear that Ceylon is unwilling to continue in the restriction scheme on the basis of the present quota. In a recent article in the *Ceylon Observer,* L. M. M. Dias lucidly sets forth Ceylon's case for a higher quota. The original basic quota for Ceylon is 77,500 tons against maximum exports of 80,300 tons in 1929; but Malaya's basic for 1934 was 504,000 tons against 457,000 tons exported in 1929 and that of Netherland India 352,000 tons against 255,000 in 1929.

Perhaps the figures showing most clearly how hardly Ceylon has been dealt with are those for the basic quotas of 1934 and the increments for the four years 1935-1938 expressed as percentages of the original quotas, and the 1935 exports as compared with those of 1929. The increments for four years in percent of the original quotas work out at 55.95% for Malay; 156.82% for Netherland India; 355.76% for India; 274.75% for Burma; 91.66 for North Borneo; 106.25% for Sarawak; 666.66% for Siam, but only 16.38% for Ceylon. A comparison of the 1935 exports with those of 1929 show in the case of Malay a decrease of 8.75%; Netherland India, a 0.19% increase; India, a 14.6% gain; Burma, a 10.6% drop; North Borneo, a 12.2% rise; Sarawak, a 73% gain; Siam, a 305% increase; but for Ceylon, a reduction of 32.3%.

Ceylon's predicament arises from the fact that she joined the International Rubber Agreement unconditionally, without stipulating first, as did India and Siam, that the basic quota should be revised after definite figures regarding acreage and production had been obtained. Now when it has become apparent that Ceylon's output capacity has been grossly underestimated, her claims for revision of her quota are turned down on the ground that granting them might jeopardize the whole restriction scheme. As Mr. Dias points out, if Ceylon's quota was inadequate in the first place, it is hard to see how the granting of her good claim would endanger the scheme.

Department of Industries

Ceylon is to establish a Department of Industries which will control industrial development and train and provide the technical staffs needed for the various industries. The respective re-

search schemes for coconuts, rubber, and tea will also be brought under this new department.

It is planned to revise the entire system of technological education in Ceylon. Experts in the industries considered capable of development here will be recruited from abroad for short periods to train selected Ceylonese, and scholarships for studying abroad will be awarded Ceylonese students. The Ceylon Technical College may eventually be placed under the control of the Director of Industries.

Prices of Dartonfield Goods

The board of management of the Rubber Research Scheme recently decided that the price of rubber tubing produced at Dartonfield should be about 75% of the prices of similar imported goods.

SOUTH INDIA

During the first half of 1936 South India shipped 10,313,822 pounds of crude rubber. Of this, 8,407,251 went to foreign countries and 1,906,571 pounds to other parts of India.

BOOK REVIEWS

(*Continued from page* 58)

This 23-year accumulation of necessary data for the scientist and engineer is both acceptable and highly essential in the commercial, educational, and research laboratory. This handbook occupies a field of its own and is the only authentic guide and reference in the sciences relating to physics and chemistry.

For convenience the handbook is divided into five sections, approximately equal in size. These sections are indicated by inserts of stiff colored paper on which is printed a summary of the contents of the particular section. The divisions follow: 1. Mathematical Tables; 2. Properties and Physical Constants; 3. General Chemical Tables; 4. Heat, Hygrometry, Sound, Electricity, and Light; 5. Quantities and Units—Miscellaneous Tables.

The broad scope of this handbook is indicated by the summary table of contents which follows: four pages on antidotes for poisons; treatment of burns and scalds, and fire precautions; 302 pages of mathematical tables; 741 pages of chemical tables; 197 pages on properties of matter; 154 pages on heat; 20 pages of hygrometric and barometric tables; seven pages of data on sound absorption; 108 pages on light; 195 pages of miscellaneous tables. The volume is concluded by a revised and enlarged cross index.

"Thiokol. Bulletin D-2." Thiokol Corp., Yardville, N. J. This 12-page booklet describes the properties and uses of Thiokol D synthetic rubber.

NETHERLAND INDIA

Softened Rubber

The Ungar and Schidrowitz softened rubber process is now being exploited in Java. Some months ago Mr. Ungar accompanied by Mr. Siddal, an English engineer, visited Netherland India to test the possibility of obtaining softened rubber directly from latex. Experiments have been carried out on a Pirelli plantation. (Pirelli, by the way, holds an interest in Softened Rubber, Ltd.) Results obtained at this estate, at Boenisari, and later on at the Pamanoekan and Tjiasem Estates of the Anglo-Dutch Plantations, Ltd., are said to be so favorable that the total output from both sources has been sold forward to America at prices above the usual market quotations.

The softened rubber process, which can now be applied to coagulum, has the great advantage that it saves time and labor in the various stages of preparation and manufacture, thus helping to cheapen the final product. This method makes possible obtaining more uniform goods than with the older methods, and finally it now becomes possible for the first time to sell raw rubber to a standard scale of plasticities.

Notes

As a result of the manufacture of tires in Java, imports from Japan have fallen considerably of late. In 1934 Japan shipped 50,900 piculs of tires, value 3,323,000 yen; in 1935, 45,000 piculs, value 2,980,000 yen. For the first four months of the current year the totals were 10,300 piculs, value 646,000 yen, against 16,100 piculs, value 1,066,000 yen, for the corresponding period of 1935.

When individual restriction is introduced for the natives next year, the government would like to impose an export duty of 10% ad valorem on native rubber instead of the regular 5%. This proposal, acrimoniously debated in the People's Council, may be defeated.

An amendment has been introduced before the People's Council which seeks to raise the quota for native rubber exports so that the ratio of the latter to estate rubber will be 1:1, it being stated that the quota for estate rubber was too high in any case. The amendment would fix the basic quotas of native rubber for 1936 at 254,000,000 kilos instead of 245,558,000 kilos; for 1937 at 264,160,000 instead of 251,660,000 kilos; for 1938, at 274,320,000 kilos instead of 261,318,000. The government strongly urged that this amendment be withdrawn.

Exports of estate rubber from Java and Madura totaled 5,086,843 kilos in August, 1936, against 6,253,389 kilos the month before. Of this amount 342 kilos was latex and 16,173 kilos in the form of manufactures. The estate rubber shipments from the Outer Provinces came to 8,706,942, against 9,812,670 kilos, and included 854,249 kilos latex. Native rubber dropped considerably, 11,882,970 kilos against 18,288,360 kilos dry weight, the month before.

Labor Recruitment Law

An ordinance "Staatsblad No. 208 of 1936," known as the "Labor Recruitment Ordinance, 1936," effective August 1, 1936, governs the recruitment of native labor in Java and Madura for employment locally and in the Outer Provinces. According to Trade Commissioner Donald W. Smith, Batavia, all native labor shall be recruited by organizations authorized by the director of the Department of Justice. In special cases, however, the director may grant special permission to recruit native labor exclusively for estate employment without the intermediary of a labor recruiting organization. In such cases regulations apply to employers. Labor recruitment organizations are required to draw up written agreements with the recruited laborers in the presence of an inspector or controller appointed by the chief of the Labor Bureau. Exemptions from the above obligation may be granted in special cases and under certain conditions on the basis of the Coolie Ordinance of 1931. The new regulations also provide for minimum standards of housing accommodations for native laborers and for medical examinations for recruits, in conformity with the regulations established by the chief of the Public Health Service.

JAPAN

Official Japanese trade statistics for the first half of 1936, transmitted by Assistant Trade Commissioner Carl H. Boehringer, Tokyo, as compared with the same period of 1935, indicate that the rubber manufacturing industry has suffered a slight trade loss.

It is thought that the high rubber prices during the first half of 1936 probably were responsible for the increased imports of scrap rubber, which, as reclaimed rubber, supplanted certain quantities of raw natural rubber.

Item	First 6 Months 1935	First 6 Months 1936	% Increase (+) or Decrease (—)
Crude Rubber Imports ..... pounds	68,458,632	63,760,092	— 6.8
Crude Rubber Reexports ..... pounds	1,735,272	1,479,324	—14.7
Crude Rubber Net Imports ..... pounds	66,723,360	62,280,768	— 6.7
Scrap Rubber Imports ..... pounds	769,560	1,486,584	+93.2
Rubber Goods Imports ..... yen	457,482	364,522	—20.3
Rubber Goods Exports ..... yen	21,890,753	20,456,752	— 6.5

Patents and Trade Marks

MACHINERY

United States

2,052,567. **Feed Roll Groover.** W. M. Haines, assignor to Haines Office-Machine Supply Co., Inc., both of Seattle, Wash.

2,052,657. **Nipple Machine.** P. A. Raiche, Providence, R. I., assignor to Davol Rubber Co., a corporation of R. I.

2,053,357. **Therapeutical Appliance Former.** G. L. Winder, Cuyahoga Falls, assignor to American Anode, Inc., Akron, both in O.

2,053,371 and 2,053,372. **Inflatable Article Form.** J. J. Lee, assignor to Barr Rubber Products Co., both of Sandusky, O.

2,053,494. **Sheet Material Waterproofer.** W. B. Pirie, Hildenborough, and C. A. Chester and W. Melville, both of London, assignors to Raymakers Syndicate, Ltd., London, all in England.

2,054,000. **Belt Vulcanizer.** W. Neerbye, assignor to A/S. Den Norske Remfabrik, both of Oslo, Norway.

2,054,113 and 2,054,114. **Sheet Material Coater.** A. Abrams and C. L. Wagner, both of Wausau, assignors to Marathon Paper Mills Co., Rothschild, all in Wis.

2,054,115 and 2,054,116. **Sheet Material Coater.** A. Abrams, C. L. Wagner, and G. W. Forcey, all of Wausau, assignors to Marathon Paper Mills Co., Rothschild, all in Wis.

2,054,476. **Power Molding Press.** J. Derry, Medford, and E. A. Terkelsen, W. Roxbury, assignors, by mesne assignments, to Terkelsen Machine Co., Boston, all in Mass.

2,054,530. **Calender Roll Aliner.** H. R. Williams, New York, N. Y.

2,054,618. **Printing Press Roll Cleaner.** B. F. Ford, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.

Dominion of Canada

360,012. **Tire Vulcanizer.** American Steel Foundries, Chicago, Ill., assignee of W. J. Miller, Pittsburgh, Pa., both in the U. S. A.

360,282. **Tubing Extruder.** Wingfoot Corp., Wilmington, Del., assignee of H. E. Riggs, Akron, and E. D. George, Cuyahoga Falls, both in O., co-inventors, all in the U. S. A.

United Kingdom

445,518. **Rubber Kneader.** Wingfoot Corp., Wilmington, Del., U. S. A.

446,143. **Latex Centrifugal Separator.** Sharples Specialty Co., Philadelphia, Pa., U. S. A., assignee of A. U. Ayres.

446,301. **Belting Vulcanizer.** A. H. Stevens, London. (Boston Woven Hose & Rubber Co., Cambridge, Mass., U. S. A.)

446,674. **Gas Expanded Rubber Mold.** D. Roberts, New York, N. Y., U. S. A.

447,054. **Artificial Sheet Material Mold.** O. Baur, (trading as Bawa Sohlen-Industrie Derendingen - Tubingen), Derendingen, Germany.

447,921. **Rubber Coagulum Roller.** C. K. Morrison, London.

448,027. **Ebonite Treater.** J. E. Malam, Birmingham, and Imperial Chemical Industries, Ltd., London.

448,204. **Tire Retread Vulcanizer.** Pharis Tire & Rubber Co., Newark, O., U. S. A.

448,468. **Battery Electrode Mold.** Young Accumulator Co. (1929), Ltd., H. De Martis, and S. J. Clark, all of New Malden.

448,501. **Tire Former.** Dunlop Rubber Co., Ltd., London, and H. Smith, Birmingham.

448,605. **Rubber Thread Apparatus.** S. W. Alderfer, Akron, O., U. S. A.

PROCESS

United States

2,052,582. **Sealing Gasket.** J. E. Robinson, Glen Ellyn, Ill., assignor to American Can Co., New York, N. Y.

2,052,875. **Elastic Fabric.** H. T. Gammons, Natick, Mass., assignor to Scott & Williams, Inc., New York, N. Y.

2,052,997. **Cleaning Molds.** F. K. Bezzenberger, Cleveland Heights, O.

2,053,123. **Artificial Thread.** F. P. Alles, Buffalo, assignor to Du Pont Rayon Co., New York, both in N. Y.

2,053,144. **Rubber Goods Finish.** W. F. Gowdy, assignor to Archer Rubber Co., both of Milford, Mass.

2,053,281. **Expansion Joint.** G. B. Gaiennie, assignor to Elastic Asphalt Co., both of Chicago, Ill.

2,053,450. **Ball.** D. F. Twiss and W. McCowan, both of Birmingham, assignors, by mesne assignments, to Dunlop Rubber Co., Ltd., London, all in England.

2,054,274. **Perforated Corset Material.** D. J. Sullivan, Fairfield, Conn., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del.

2,054,354. **Elastic Thread.** S. W. Alderfer, assignor of ½ to E. D. Andrews, both of Akron, O.

2,054,448. **Adhesive Sheet Material.** F. H. Russell, Needham, assignor of ½ to Dewey & Almy Chemical Co., N. Cambridge, and ½ to Pepperell Mfg. Co., Boston, all in Mass.

2,054,780. **Rubber Article.** R. S. Bley, Elizabethton, Tenn., assignor to North American Rayon Corp., New York, N. Y.

Dominion of Canada

359,941. **Belt.** Dayton Rubber Mfg. Co., assignee of A. L. Freedlander, both of Dayton, O., U. S. A.

359,944. **Covering Suction Rolls.** Dominion Engineering Works, Ltd., Lachine, P. Q., assignee of G. R. Keltie, Woonsocket, R. I., U. S. A.

360,035. **Container.** Daller Carton Co., Inc., New York, N. Y., assignee of A. O. Daller, Dennisport, Mass., both in the U. S. A.

360,100. **Sponge Rubber Goods.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of W. H. Chapman, E. W. B. Owen, and D. W. Pounder, co-inventors, all of Birmingham, England.

360,181. **Rubber Thread.** T. L. Shepherd, London, England.

360,280. **Belt.** Wingfoot Corp., Wilmington, Del., assignee of A. A. Teisher and G. I. McNeil, co-inventors, both of Akron, O., all in the U. S. A.

United Kingdom

446,285. **Porous Chlorinated Rubber.** G. H. Preston, Warwick, and Imperial Chemical Industries, Ltd., London.

446,403. **Vulcanizing Tires.** C. Arnold, London. (Seiberling Rubber Co., Akron, O., U. S. A.)

446,460. **Rubber Powder.** Rubber-Latex-Poeder-Cie Naamlooze Vennootschap and M. J. Stam, both of The Hague, Holland.

447,249. **Vulcanizing Rubber.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands.

447,870. **Rubber Article.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands.

447,972 and 448,098. **Rubber Thread.** T. L. Shepherd, London.

448,122. **Molding Cellular Rubber-Fiber Articles.** J. A. Howard, London.

448,132. **Cellular Rubber.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, and S. D. Taylor and E. W. Madge, both of Birmingham.

448,184. **Perforated Rubber Sheet.** P. H. Head, Attenborough.

448,185. **Elastic Fabric.** United States Rubber Co., New York, assignee of P. Adamson, Rye, both in N. Y., U. S. A.

448,212. **Leather-Like Product.** Soc. Des Procedes Ecla, Paris, France.

448,214. **Forming Rough Surfaces on Rubber Goods.** J. Fromm, Berlin, Germany.

448,660. **Hollow Roller.** G. R. Keltie, Woonsocket, R. I., U. S. A.

448,688. **Rubber Sheet.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, and E. W. Madge and F. J. Payne, both of Birmingham.

448,784. **Upholstery Pads.** J. A. Talalay, Bedford.

CHEMICAL

United States

2,052,607. **Rubber Compounding Material.** A. B. Cowdery, Needham, Mass., assignor to Barrett Co., New York, N. Y.

2,052,610. **Wear and Heat Resisting Composition.** J. Driscoll, Plainfield, N. J., assignor to Johns-Manville Corp., New York, N. Y.

2,052,672. **Rubber Conversion Product.** F. S. Shadbolt, Darwen, assignor to Walpamur Co., Ltd., London, both in England.

2,053,271. **Rubber Product.** H. B. Dykstra, assignor to E. I. du Pont de Nemours & Co., both of Wilmington, Del.
2,053,530. **Compounding Rubber.** R. J. Noble, Malden, assignor to Heveatex Corp., Melrose, both in Mass.
2,053,773. **Thermoplastic Adhesive.** R. M. Freydberg, New York, assignor to Acme Backing Corp., Brooklyn, both in N. Y.
2,053,785. **Antioxidant.** W. L. Semon, Silver Lake Village, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,054,084. **Carbon Black by Thermal Dissociation.** J. J. Jakosky, Los Angeles, assignor to Electroblacks, Inc., Culver City, both in Calif.
2,054,112. **Coating Composition.** A. Abrams and C. L. Wagner, both of Wausau, assignors to Marathon Paper Mills Co., Rothschild, all in Wis.
2,054,243. **Molding Composition.** A. B. Cowdery, Needham, Mass, assignor to Barrett Co., New York, N. Y.
2,054,283. **Factis.** C. Ellis, Montclair, N. J.
2,054,389. **Light Metal Protective Composition.** L. Rosenthal, Leverkusen-Wiesdorf, and R. Hebermehl, Cologne-Deutz, assignors to I. G. Farbenindustrie A. G., Frankfurt a. M., all in Germany.
2,054,453. **Accelerator.** J. Teppema, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.
2,054,454. **Molded Product.** H. R. Thies and T. A. Riehl, both of Akron, O., assignors to Wingfoot Corp., Wilmington, Del.
2,054,483. **Age Resister.** G. D. Martin, Nitro, W. Va., assignor, by mesne assignments, to Monsanto Chemical Co., Wilmington, Del.

Dominion of Canada

359,987. **Rubberized Paint.** J. H. Gray, Victoria, B. C.
359,992. **Rubber Containing Paint.** J. P. Henharen, Durban, Natal, South Africa.
359,993. **Linoleum Base.** J. P. Henharen, Durban, Natal, South Africa.
360,042. **Vulcanizable Composition.** I. G. Farbenindustrie A. G., Frankfurt a. M., assignee of P. Stocklin, Opladen, and E. Konrad, Leverkusen-I. G. Werk, co-inventors, all in Germany.
360,224. **Accelerator.** Goodyear Tire & Rubber Co., Akron, assignee of L. B. Sebrell, Silver Lake, both in O., U. S. A.
360,249. **Accelerator.** Wingfoot Corp., Wilmington, Del., assignee of H. I. Cramer, Cuyahoga Falls, O., both in the U. S. A.
360,396. **Accelerator.** Peter Spence & Sons, Ltd., assignee of A. L. Hock, both of Manchester, England.

United Kingdom

446,278. **Rubber Composition.** J. P. Baxter, Widnes, F. P. Leach, Frodsham, and Imperial Chemical Industries, Ltd., London.
446,399. **Cable Waterproofing Composition.** Siemens-Schuckertwerke A. G., Berlin, Germany.
446,814. **Bitumen-Rubber Composition.** R. Riecke, Berlin, Germany.
446,818. **Halogen Compound.** Marsene Corp. of America, Gary, Ind., U. S. A.
446,893. **Fibrous Composition.** Compagnie Internationale Des Cuirs Comprimes Attila C.I.C.C.A. Soc. Anon., Brussels, Belgium.
446,981. **Plastic Composition.** E. I. du Pont de Nemours & Co., Wilmington, Del., U. S. A.
447,110. **Rubber Hydrochloride.** Marsene Corp. of America, Gary, Ind., U. S. A.
447,256. **Activator.** J. Talalay and Magna Rubber Co., Ltd., both of Bedford.
447,371. **Moisture Proofing Composition.** M. F. Monbiot, London.
447,416. **Bitumen-Rubber Composition.** J. Lewis, London.
447,458. **Accelerator.** United States Rubber Co., New York, N. Y., assignee of C. Coleman, Passaic, N. J., both in the U. S. A.
447,538. **Utilizing Waste Rubber.** F. N. Pickett, London.
447,540. **Textile Treatment.** British Celanese, Ltd., London, and J. Allan and J. A. Wainwright, both of Spondon.
447,764. **Cellulose Derivative Composition.** E. I. du Pont de Nemours & Co. and M. M. Brubaker, both of Wilmington, Del., U. S. A.
447,898. **Latex Emulsion.** L. H. Flett, Hamburg, N. Y., U. S. A.
447,926. **Rubber Composition.** Liverpool Electric Cable Co., Ltd., and A. E. Hughes, both of London.
447,954. **Antioxidant.** Belvedere Chemical Co., Ltd., Westminster, assignee of L. H. Howland, Nutley, N. J., U. S. A.
448,093. **Chlorinated Rubber Composition.** Chemische Fabrik Buckau, Ammendorf, Germany.
448,100. **Phenol Aldehyde Condensation Product.** Brick Trust, Ltd., London.
448,105. **Rubber Composition.** D. D. Pratt, Teddington.
448,126. **Accelerator.** E. I. du Pont de Nemours & Co., Wilmington, Del., U. S. A.
448,151. **Rubber Composition.** Plessey Co., Ltd., Ilford.
448,203. **Creaming Latex.** L. Mellersh-Jackson, London. (United States Rubber Co., New York, N. Y., U. S. A.)
448,237. **Activator.** Belvedere Chemical Co., Ltd., Manchester.
448,244 and 448,245. **Creaming Latex.** United States Rubber Co., New York, N. Y., U. S. A.
448,414. **Accelerator.** Wingfoot Corp., Wilmington, Del., U. S. A.
448,458. **Rubber Composition.** L. Mellersh-Jackson, London. (R. T. Vanderbilt Co., Inc., New York, N. Y., U. S. A.)
448,497. **Molding Powder.** F. N. Pickett, London.
448,711. **Wax Emulsion.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, and E. A. Murphy and E. W. Madge, both of Birmingham.

Germany

635,098. **Converting Old Rubber into Oil and a Carbon Residue.** L. Biseo, Rome, Italy. Represented by J. Koch.
635,196. **Chlorinated Rubber.** I. G. Farbenindustrie A.G., Frankfurt a.M.
635,470. **Treating Golf Balls with Halogens to Prepare for Coloring and Varnishing.** Deutsche Dunlop Gummi-Compagnie A.G., Hanau a.M.
635,547. **Plastifying Rubber Waste Containing Fabric.** E. Bemelsmans, The Hague, Netherlands. Represented by G. Lotterhos, Frankfurt a.M., and M. Eule, Berlin.
635,869. **Purifying and Deproteinizing Rubber.** Electrical Research Products, Inc., New York, N. Y., U. S. A. Represented by B. Kugelmann, Berlin.

GENERAL

United States

2,050,736. **Hydraulic Brake Cylinder.** F. W. Sampson, Dayton, O., assignor to General Motors Corp., Detroit, Mich.
2,050,751. **Boot.** B. B. Enos, Salem, Mass.
2,050,799. **Closure Cap.** R. Landau, Vienna, Austria.
2,050,801. **Golf Club.** A. E. Lard, Washington, D. C.
2,050,884. **Doll Head and Eye Mechanism.** L. J. Grubman, Belle Harbor, assignor to Margon Corp., New York, both in N. Y.
2,050,888. **Cable.** E. Kirch, Berlin-Oberschoneweide, Germany, assignor to General Electric Co., a corporation of N. Y.
2,050,920. **Windshield Wiper.** S. Bujnicki, Newark, N. J.
2,050,990 and 2,050,991. **Cable.** R. W. Atkinson, Perth Amboy, N. J., assignor to General Cable Corp., New York, N. Y.
2,051,022. **Bodywork.** E. Bugatti, Molsheim, France.
2,051,042. **Tire Pressure Measurer.** W. H. and A. G. Hendel, both of Minneapolis, Minn.
2,051,065. **Corset.** J. L. Alberts, assignor to S. S. Alberts, both of Yonkers, N. Y.
2,051,098. **Inhaler.** G. E. Morrison, Two Harbors, Minn.
2,051,222. **Moisture Applier.** I. N. Odell, assignor to Defender Photo Supply Co., Inc., both of Rochester, N. Y.
2,051,236. **Shoe Soling Appliance.** J. O. Yunker, Wauwatosa, and A. Kahn, Milwaukee, both in Wis.
2,051,280. **Wringer.** R. J. Waterworth, assignor to Prima Mfg. Co., Inc., both of Sidney, O.
2,051,315. **Tire Pressure Compensator.** H. H. Parker, Cleveland, O.
2,051,316. **Cordage.** K. R. Shaw, assignor to United Elastic Corp., both of Easthampton, Mass.
2,051,340. **Fountain Brush.** H. G. Lomas, Detroit, Mich.
2,051,349. **Anesthetic Solution Preserver.** S. D. Goldberg, assignor to Novocol Chemical Mfg. Co., Inc., both of Brooklyn, N. Y.
2,051,384. **Head Covering.** R. Lipton, New York, N. Y.
2,051,408. **Bracket.** C. E. Karst, assignor to Brunhoff Mfg. Co., both of Cincinnati, O.
2,051,423. **Insulated Conductor.** E. C. Schacht, assignor to Behr-Manning Corp., both of Troy, N. Y.
2,051,440. **Powder Atomizer.** H. Eicken, Cologne, Germany.
2,051,442. **Power Transmitting Coupling.** H. D. Geyer, Dayton, O., assignor, by mesne assignments, to General Motors Corp., Detroit, Mich.
2,051,444. **Maternity Dress.** A. E. Haister, New York, N. Y.
2,051,549. **Separable Attachment Plug.** I. D. De La Hunt, Memphis, Tenn.
2,051,574. **Sliding Fastener.** S. Quis-

ling, Madison, Wis., assignor to Hookless Fastener Co., Meadville, Pa.

2,051,668. **Windshield Wiper Blade.** L. Zaiger, Lynn, Mass.

2,051,686. **Ear Protector.** R. Dison, Oakland, Calif.

2,051,696. **Roller Skate Tire.** P. J. Gabriel and F. J. Kammerer, both of Brooklyn, N. Y.

2,051,750. **Umbrella.** J. A. H. Siers, Jersey City, N. J.

2,051,834. **Milking Machine Inflation Cleaner.** F. A. Fabrey, assignor to Raybestos-Manhattan, Inc., both of Passaic, N. J.

2,051,847. **Tooth Brush Holder.** W. S. Halstead, White Plains, N. Y.

2,051,858. **Printing Cylinder.** W. F. Huck, Richmond Hill, N. Y., and I. A. Hunting, S. Plainfield, N. J., assignors, by mesne assignments, to R. Hoe & Co., Inc., New York, N. Y.

2,051,864. **Vehicle Suspension.** H. A. Knox, Davenport, Iowa, and T. H. Nixon, United States Army, Gettysburg, Pa.

2,051,865. **Doll Head.** A. Konoff, New York, and L. J. Grubman, Belle Harbor, assignors to Margon Corp., New York, all in N. Y.

2,051,875. **Doll Head and Eye Set.** S. Marcus, Belle Harbor, assignor to Margon Corp., New York, both in N. Y.

2,051,876. **Doll Eye.** S. Marcus, Belle Harbor, assignor to Margon Corp., New York, both in N. Y.

2,051,921. **Truss.** H. M. Turner, Kansas City, Mo.

2,051,925. **Electrical Connecter.** J. Wertzheiser, Newark, assignor to Hatfield Wire & Cable Co., Hillside, both in N. J.

2,051,940. **Bucket and Pail.** H. G. W. Chichester-Miles, London, England.

2,051,967 and 2,051,968. **Wheel Brake.** S. Saito, Toyonaka-cho, and N. Yamamoto, Osaka, both in Japan.

2,051,976. **Closure Cap.** W. P. White, Glencoe, assignor to White Cap Co., Chicago, both in Ill.

2,051,999. **Windshield Defroster.** P. Nielsen, assignor to Jubilee Mfg. Co., both of Omaha, Neb.

2,052,088. **Elastic Fabric.** C. E. Drumheller, Springfield, assignor to William Carter Co., Needham Heights, both in Mass.

2,052,123. **Flexible Headwear.** S. Adamson, Larchmont, assignor to United States Rubber Products, Inc., New York, both in N. Y.

2,052,130. **Airplane Wheel.** G. H. Cassady, Detroit, Mich., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,052,132. **Spindle Drive.** H. Z. Cobb, Providence, and R. S. Francis, Rumford, both in R. I., assignors, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,052,158. **Dental Amalgam Cartridge.** J. Zink, Regensburg-Kumpfmuhl, Germany.

2,052,163. **Foundation Garment.** C. Brown, New York, N. Y.

2,052,240. **Water Skate.** F. K. Min, Paia, Maui, T. H.

2,052,277. **Tire Safety Device.** C. S. Burnett, Presidio of San Francisco, Calif.

2,052,321. **Sinus Treatment.** H. V. Smart, New York, N. Y.

2,052,342. **Shaft Coupling.** M. Dornig, Milan, and F. Fauser, Novara, both in Italy.

2,052,344. **Battery Filler.** L. Edelmann, Chicago, Ill.

2,052,416. **Tire.** L. C. Mills, Chicago, Ill.

2,052,496. **Invalid Drinking Glass and Tube.** G. Stassi, New Orleans, La.

2,052,527. **Windshield Heater and Defroster.** J. H. Cohen, assignor to Casco Products Corp., both of Bridgeport, Conn.

2,052,566. **Typewriter Feed Roll.** W. M. Haines, assignor to Haines Office-Machine Supply Co., Inc., both of Seattle, Wash.

2,052,588. **Eyelash Curler.** W. R. Tuttle and C. W. Stickel, assignors to Kurlash Co., Inc., Rochester, N. Y.

2,052,589. **Cushion Support.** A. Weiland, Philadelphia, Pa., assignor to Baldwin-Southwark Corp., a corporation of Del.

2,052,603. **Ring Packing.** G. Christenson, Plainfield, N. J., assignor to Johns-Manville Corp., New York.

2,052,605. **Flexibly-Backed Floor Mat.** S. C. Clark, H. M. Pryale, and D. R. Cotterman, all of Pontiac, Mich.

2,052,631. **Truss Pad.** H. E. Kenworthy, Tacoma, Wash.

2,052,636. **Outboard Motor Elastic Fastening.** A. Lesage, Schweinfurt, Germany.

2,052,644. **Heating Unit.** M. Murphy, Indianapolis, Ind.

2,052,656. **Massager.** O. C. Prien, Hamburg, Germany.

2,052,690. **Elevator.** J. T. Austin, Hartford, Conn.

2,052,692. **Shoe.** A. J. Brauer and F. P. Wagner, both of St. Louis, Mo.

2,052,707. **Brassiere.** D. Haimoff, assignor, by mesne assignments, to Sho-Form Brassières, Inc., both of Los Angeles, Calif.

2,052,768. **Multiple Vacuum Plunger.** J. M. Hinkle and D. Owens, both of Barbourville, Ky.

2,052,836. **Massage Brush.** R. Löwy, Vienna, Austria.

2,052,864. **Inking Stencil.** O. E. Borowetz, Plainfield, N. J.

2,052,893. **Antiskid Device.** A. G. O'Konesky, St. Paul, Minn.

2,052,898. **Refrigerator.** E. F. Schweller, assignor to General Motors Corp., both of Dayton, O.

2,052,930. **Vehicle Spring.** L. A. Laursen, Copley, O.

2,052,935. **Abdomen Support.** P. J. Moran, Newark, N. J., assignor to I. Rosner, New York, N. Y.

2,052,984. **Trussed Flooring.** J. O. Madison, Brooklyn, N. Y.; J. M. Madison, executrix of said J. O. Madison, deceased.

2,053,107. **Typewriter.** H. L. Pitman, Hartford, Conn., assignor to Underwood Elliott Fisher Co., New York, N. Y.

2,053,112. **Flexible Conductor.** E. Schnabel, Berlin-Lichterfeld, Germany.

2,053,136. **Connecter.** F. C. de Reamer, Bridgeport, Conn., assignor to General Electric Co., a corporation of N. Y.

2,053,140. **Jar Sealing Ring.** W. T. Exton, Webster Groves, Mo., assignor to Ball Bros. Co., a corporation of Ind.

2,053,165. **Woman's Undergarment.** L. B. Pruett, Chattanooga, Tenn.

2,053,185. **Centrifugal Tube Cushion.** A. E. Flowers, Poughkeepsie, assignor to De Laval Separator Co., New York, both in N. Y.

2,053,245. **Tire.** M. M. Girz, Akron, O., assignor of 51/100 to C. J. Bertschy, Wheeling, W. Va.

Dominion of Canada

359,906. **Movable Dam.** Maschinenfabrik Augsburg-Nürnberg, A. G., Nürnberg, assignee of T. Becher, Wiesbaden, both in Germany.

359,942. **Belt Connecter.** Dayton Rubber Mfg. Co., assignee of E. H. Kremer, both of Dayton, O., U. S. A.

359,957. **Hydraulic Power Transmission.** S. Smith & Sons (Motor Accessories), Ltd., assignee of G. Bowman, both of London, and G. C. Burgess, Wembley, co-inventors, all in England.

359,968. **Collapsible Valve.** E. Jarvis, Vancouver, B. C.

359,982. **Elastic Yarn and Thread.** R. Pickles, Burnley, and J. Pickles, Fence, co-inventors, both in England.

360,043. **Tennis Ball.** Felters Co., Boston, assignee of G. H. Wood, Worcester, both in Mass., U. S. A.

360,050. **Heel.** I.T.S. Co., assignee of C. H. Ingwer, both of Elyria, O., U. S. A.

360,051. **Composite Rubber Article.** I.T.S. Co., assignee of C. H. Ingwer, both of Elyria, O., U. S. A.

360,097. **Running Board.** Duffy Mfg. Co., assignee of J. F. Duffy, both of Holland, Mich., U. S. A.

360,098. **Flexible Bearing.** Duffy Mfg. Co., assignee of J. F. Duffy, both of Holland, Mich., U. S. A.

360,101. **Bathing Trunks.** Jersey's, Ltd., assignee of R. Wilkinson, both of Toronto, Ont.

360,126. **Shoe Heel Attacher.** J. Coggans, Glasgow, Scotland.

360,179. **Toy Train Track Pad.** C. S Satterthwait, Kenilworth, Pa., U. S. A.

360,248. **Elastic Garment.** Warner Bros. Co., Bridgeport, assignee of J. Field, Fairfield, both in Conn., U. S. A.

360,271. **Electric Accumulator Plate.** Joseph Lucas, Ltd., assignee of J. Merrick, both of Birmingham, England.

360,272. **Scouring Implement.** Metal Textile Corp., W. Orange, assignee of R. B. Kingman, Orange, both in N. J., U. S. A.

360,279. **Rubber Cushion.** Wingfoot Corp., Wilmington, Del., assignee of H. W. Protzeller and F. Fahland, co-inventors, both of Fairmont, Minn., all in the U. S. A.

360,281. **Tire.** Wingfoot Corp., Wilmington, Del., assignee of R. W. Sohl, Akron, O., both in the U. S. A.

360,283. **Secondary Battery.** Young Accumulator Co. (1929), Ltd., assignee of H. De Martis and S. J. Clark, co-inventors, all of New Malden, England.

360,287. **Frost Shield.** W. F. Auger, Winnipeg, Man.

360,304. **Fruit Juice Extractor.** K. Larson, Pawtucket, R. I., U. S. A.

360,305. **Vehicle Wheel.** J. Mayer, Detroit, Mich., U. S. A.

360,309. **Float.** A. Perri, McKees Rocks, Pa., U. S. A.

360,316. **Polishing Wheel.** R. W. Springer, Detroit, Mich., U. S. A.

360,340. **Overall Suspender Strap.** L. W. Joyce, Greensboro, N. C., U. S. A.

360,357. **Universal Plain Bearing.** Aktiebolaget Svenska Kullagerfabriken, assignee of N. A. Palmgren, both of Goteborg, Sweden.

360,383. **Girdle and Brassiere.** H. W. Gossard Co., Chicago, Ill., assignee of Y. Towey, San Francisco, Calif., both in the U. S. A.

360,389. **Garment.** Kops Bros., Inc.,

assignee of W. Kops, both of New York, N. Y., U. S. A.

360,399. **Dovetail.** Ternstedt Mfg. Co., assignee of A. J. Fisher and E. G. Simpson, co-inventors, all of Detroit, Mich., U. S. A.

360,425. **Vehicle Splash Guard.** Casco Products Corp., assignee of J. H. Cohen, both of Bridgeport, Conn., U. S. A.

360,433. **Traction Device.** Hipkins Traction Device Co., assignee of O. F. Hipkins, both of Port Deposit, Md., U. S. A.

360,435. **Arch Support.** Hood Rubber Co., Inc., Watertown, assignee of H. L. Whitman, Bridgewater, both in Mass., U. S. A.

360,456. **Bathing Suit.** S. d'Achon, Paris, France.

360,458. **Safety Tire.** A. E. Dietz, Washington, D. C., U. S. A.

360,472. **Traction Mat.** C. Raine, Montreal, P. Q.

United Kingdom

445,487. **Draught Excluder.** W. J. Spicer and H. I. Fordred, both of Birmingham.

445,492. **Vehicle Body.** N. Howard, Liverpool.

445,544. **Vehicle Spring Suspension.** W. O. Duncan, Birmingham. (Steel Wheel Corp., Chicago, Ill., U. S. A.)

445,824. **Paper Container Apparatus.** Jagenberg-Werke A. G., Düsseldorf, Germany.

445,826. **Toy Airplane.** G. Boehme, Lüdenscheid, Germany.

445,830. **Vehicle Spring Suspension.** Daimler-Benz A. G., Stuttgart, Germany.

445,949. **Cutlery Case.** Marris's, Ltd., and R. G. Marris, Birmingham.

446,003. **Railway Vehicle Vestibule.** E. Bugatti, Molsheim, France.

446,025. **Vehicle Wheel Arrangement.** Superbuilt Products, Ltd., Guildford, and A. E. Adey, Reading.

446,043. **Printing Machine.** B. Wale, Chicago, Ill., U. S. A.

446,051. **Tire.** C. E. Veil-Picard, Levallois-Perret, France.

446,059. **Floor Surfacing.** Soc. Italiana Pirelli, Milan, Italy.

446,119. **Lifting Sling.** H. Scott-Paine, Southampton.

446,122. **Platform Weigher.** W. & T. Avery, Ltd., and C. M. Sykes, both of Birmingham.

446,127. **Carton Closer.** Burt Machine Co., Inc., Baltimore, Md., U. S. A.

446,155. **Paving Block.** E. Lord, Welwyn Garden City, and W. K. Webster, Weybridge.

446,182. **Game.** W. Smith and J. C. Hall, both of London, and A. Daniels, New Malden.

446,183. **Suspenders.** H. E. Young, Epsom Downs, and E. C. Leaman, London.

446,202. **Tire.** Dunlop Rubber Co., Ltd., London, and E. F. Field, Birmingham.

446,224. **Rubber-Coated Paper.** Wingfoot Corp., Wilmington, Del., U. S. A

446,236. **Vehicle Opening Roof.** W. Overton, Walsall.

446,272. **Garment Hanger.** W. Miller, Manchester.

446,280. **Scalp Massager.** Gro-Flex Corp., assignee of R. H. Hamblin, both of Indianapolis, Ind., U. S. A.

446,281. **Tire Valve.** H. H. Burton and John Bull Rubber Co., Ltd., both of Leicester.

446,300. **Cushion.** Moulded Hair Co., Ltd., and J. A. Howard, both of London.

446,302. **Bucket Silencer.** E. M. Woodward, Birmingham.

446,324. **Cricket Bat Handle.** A. E. Trimmings, St. Neots.

446,372. **Tire Deflation Indicator.** Michelin & Cie., Clermont Ferrand, France.

446,428. **Amusement Vehicle.** S. St. George and W. D. Meagher, both of London.

446,443. **Reclining Seat.** B. Matthews, Brentford.

446,506. **Ironing Machine Roller.** D. Y. B. Tanqueray and Baker Perkins, Ltd., both of Peterborough, and B. S. Davies and Sorbo, Ltd., both of Woking.

446,527. **Boot Machine.** N. E. Brookes, London. (J. S. Kamborian, W. Newton, Mass., U. S. A.)

446,546. **Cricket Bat Handle.** F. Clough, Bradford.

446,553. **Cable.** Siemens & Halske A. G., Berlin, Germany.

446,565. **Railway Vehicle Bogy.** Schweizerische Industrie-Ges., Neuhausen, Switzerland.

446,597. **Tire Tread.** Dunlop Rubber Co., Ltd., London, and D. F. Twiss and J. A. Wilson, both of Birmingham.

446,645. **Conductor.** Kabelwerk Vacha A. G., Vacha, Germany.

446,648. **Balloon for Raising Sunken Objects.** S. Zic, Split, Yugoslavia.

446,657. **Borehole.** L. M. C. Seamark, Petersfield.

446,660. **Electromedical Apparatus.** Siemens-Reiniger-Werke A. G., Berlin, Germany.

446,668. **Cushion Resilient Filling.** Chrysler Corp., Highland Park, Mich., U. S. A., assignee of R. K. Lee and C. A. Tea.

446,677. **Electric Battery Lamp.** J. Lucas, Ltd., and F. Hanmer, both of Birmingham.

446,691. **Amusement Vehicle.** P. Brewster, Peaslake, and T. Baker & Sons (Compton), Ltd., Compton.

446,726. **Indian Club.** R. G. Bateson, Stockport.

446,738. **Fabric Embosser.** British Celanese, Ltd., London, and A. Mellor and R. J. Mann, Spondon.

446,753. **Egg Grader.** G. C. Bingham, Maldon.

446,788. **Surgical Heater or Cooler.** S.N.I.M. Soc. Anon., Lausanne, Switzerland.

446,801. **Refrigerator.** E. Freytag, Styria, Austria.

446,812. **Laundry Net.** United States Rubber Products, Inc., New York, N. Y., U. S. A.

446,827. **Liquid Deliverer.** G. A. Bowler and F. P. Rittershaus, both of London.

446,842. **Railway Vehicle Buffer.** G. Turton, Platts & Co., Ltd., Sheffield, and F. Hewitt, Dronfield.

446,879 **Artificial Respirator.** P. Petersen, Lund, Sweden.

446,897. **Railway Vehicle Tire.** H. H. J. Ruyten, Roermond, Holland.

446,916. **Picnic Case.** Marris's, Ltd., and R. G. Marris, both of Birmingham.

446,985. **Vehicle Spring Suspension.** Alvis Car & Engineering Co., Ltd., and G. T. Smith-Clarke, both of Coventry.

446,996. **Hair Curler.** Jarrett, Rainsford & Laughton, Ltd., and G. A. Laughton, both of Birmingham.

Germany

635,134. **Closure for Hot Water Bottles, Etc.** Harburger Gummiwarenfabrik Phoenix A.G., Harburg-Wilhelmsburg.

635,258. **Hard, Many Layered Holder for Gelatine Films, Etc.** Veritas Gummiwerke A.G., Berlin-Lichterfelde, and M. Refess-Remisoff, Berlin-Schoneberg.

635,718. **Perforated Joint.** H. Sussmann and K. Plotke, both of Berlin.

636,051. **Inner Tube.** Firestone Tire & Rubber Co., Akron, O., U. S. A. Represented by G. Bertram and K. Lengner, both of Berlin.

TRADE MARKS

United States

337,778. **Seelslym.** Corsets and brassieres. Matilda Etches, Ltd., London, England.

337,784. **Gatex.** Hose, belts, tire repair patches, brake linings, and machinery packing. Gates Rubber Co., Denver, Colo.

337,788. Scenic representation and two seals, and above the representation the words **"Arctic Bay."** Waterproofing compound. Hettrick Mfg. Co., Toledo, O.

337,817. **Stripalastic.** Rubber tape. Easthampton Rubber Thread Co., Easthampton, Mass.

337,822. Fanciful design containing a representation of a pair of hands holding a vial in each hand, and below the words: **"Chemicals by Glyco."** Chemical compounds for rubber, etc. Glyco Products Co., Inc., New York.

337,825. **Pinch Penny.** Bathing caps, garters, raincoats, rubber sandals, etc. Stern Bros., New York, N. Y.

337,835. **"Standard Oil Company of New Jersey."** Petrolatums, petrolatum oils and greases, and oils for rubber reclamation, etc. Standard Oil Co., of N. J., Wilmington, Del.

337,861. Representation of the Eiffel Tower. Prophylactic rubber articles. Youngs Rubber Corp., Inc., New York, N. Y.

337,916. **Hornex.** Rubber compound for weatherstripping and as an adhesive. A. C. Horn Co., Long Island City, N. Y.

337,945. **Tensilgloss.** Rubber surfaced squeeze rolls. American Wringer Co., Inc., Woonsocket, R. I.

337,980. **Royal Nassau.** Golf balls. United States Rubber Products, Inc., New York, N. Y.

338,043. **Worthmore.** Canvas and rubber belts and belting and tires. Willhelm Lubrication Co., St. Paul, Minn.

338,054. Word: **"Brose;"** the letter **"O"** of the word is written very large and contains the words: **"Life Long."** Self-vulcanizing rubber patches. H. B. Brose, Chicago, Ill.

338,139. Representation of a man and a red cross, and the words: **"M-Dee's, Trade Mark."** Latex non-medicated first-aid bandage. G. B. Edmunds, doing business as M. D. Mfg. Co., Decatur, Ga.

338,178. Representation of a blue and yellow banded valve stem. Valve stem. Goodyear Tire & Rubber Co., Akron, O.

338,193. **Federal.** Golf balls, balancing toys, and coaster wagons. Federal Rubber Co., Chicago, Ill.

(*Continued on page 75*)

Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

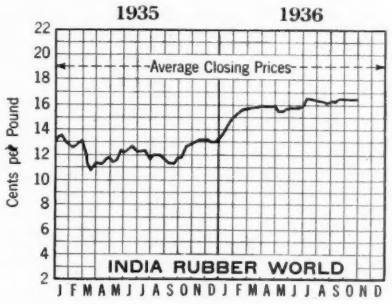
Futures	Aug. 26	Sept. 26	Oct. 3	Oct. 10	Oct. 17	Oct. 24
Sept.	16.22	16.39	.....	.....	.....	.....
Oct.	16.29	16.37	16.35	16.38	16.43	16.48
Dec.	16.41	16.47	16.48	16.48	16.49	16.52
Mar.	16.52	16.59	16.57	16.58	16.56	16.57
July	16.71	16.77	16.74	16.74	16.69	16.69
Sept.	.....	.....	16.81	16.81	16.75	16.71
Volume per week (tons)	6,140	5,730	6,950	2,350	2,970	2,950

THE above tabulation shows prices of representative future contracts on the New York market during approximately the past two months.

At the close of September the government of the Dutch East Indies raised the export duty on native rubber from 37 to 47 guilders per 100 kilograms, dry weight, to offset the drop in the guilder, to hold native production in check. This advance in the export duty was followed by two minor increases on October 3 and 13. For the most part the tone of the market was steady and activity very much restricted. Trading in futures reached a new low on October 23, when the contracts totaled only 80 tons. Speculation was held in abeyance awaiting the outcome of the meeting of the International Rubber Regulation Committee set for October 27.

The committee at this I. R. R. C. meeting on October 27 raised the permissible exports of the countries in the restriction scheme from 65 to 70% of the basic quotas for the first half of 1937. If the exportable quotas for the second half of 1937 remain as now set for the first half, the exportable rubber would amount to 950,000 tons of plantation rubber, including 40,000 for Siam and 30,000 for French Indo-China, but exclusive of exports from Mexico and Brazil. The next meeting of the International Rubber Regulation Committee will be held December 15.

Futures on the New York market



New York Outside Market—Spot Ribbed Smoked Sheets

rose from 24 to 29 points on October 27 as a result of the advance of the exportable quota. No. 1 ribbed smoked sheet spot closed at 16.75¢ nominal. The volume of the day's contracts amounted to 3,290 tons, far exceeding the previous daily record of the month.

Trade Marks

(*Continued from page* 74)

338,194. **Time to Re-Tire.** Golf balls, balancing toys, and coaster wagons. Fisk Rubber Corp., Chicopee Falls, Mass.

338,195. Representation of a small boy about to retire holding a tire in his right hand and a lighted candle in his left. Golf balls, balancing toys, and coaster wagons. Fisk Rubber Corp., Chicopee Falls, Mass.

338,198. Representation of a winged horse and the word: **"Pegasus."** Golf balls. Socony-Vacuum Oil Co., Inc., New York, N. Y.

338,204. Representation of a pennant flying the word: **"Federal."** Golf balls, balancing toys, and coaster wagons. Federal Rubber Co., Chicago, Ill.

338,282. **Permacord.** Portable electrical cordage and conductors. Crescent Insulated Wire & Cable Co., Trenton, N. J.

New York Outside Market

Factory buying activity was at low ebb during the month from September 26 to October 26. Toward the end of this period factory interest was centered on the change of export quota that the I. R. R. C. might decide at its meeting October 27.

Week-end closing prices on No. 1 ribbed smoked sheets follow: September 26, 16 7/8¢; October 3, 16½; October 10, 16½; October 17, 16 7/8; October 24, 16½.

New York Quotations

New York outside market rubber quotations in cents per pound

	Oct. 26, 1935	Sept. 26, 1936	Oct. 26, 1936
Paras			
Upriver fine	11⅞	21	21
Upriver fine	*13¼	*25¼	*25
Upriver coarse	8	12	12
Upriver coarse	*12¼	*17	*17
Islands fine	12¼	20	21
Islands fine	*13¼	*24	*25
Acre, Bolivian fine	12	21¼	21½
Acre, Bolivian fine	*13½	*25½	*26
Beni, Bolivian	11⅞	21½	22
Madeira fine	12¼	21	21¼
Caucho			
Upper ball	8	12	12
Upper ball	*12¼	*17	*17
Lower ball	7¾	11¾	11½
Pontianak			
Bandjermasin	7	7	6
Pressed block	12½	10/21	10/20
Sarawak	7	7	6
Guayule			
Duro, washed and dried	12	13¼	13⅛
Ampar	13	13¾	13¾
Africans			
Rio Nuñez	14	15	15
Black Kassai	13	15¼	15¼
Prime Niger flake	25	27½	27½
Gutta Percha			
Gutta Siak	12½	10¼	10½
Gutta Soh	12½	13½	14½
Red Macassar	1.10	1.00	1.10
Balata			
Block, Ciudad Bolivar	32	30	30
Manaos block	29	27	25
Surinam sheets	33	32	33
Amber	37	37	38

*Washed and dried crepe. Shipments from Brazil.

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	—September, 1936—												October, 1936									
	28	29	30	1	2	3	5	6	7	8	9	10*	12†	13	14	15	16	17	19	20	21	22	23	24
No. 1 Ribbed Smoked Sheet	16 7/8	16½	16½	16 7/8	16 7/8	16½	16½	16 3/8	16 7/8	16 3/8	16½	..	..	16½	16½	16 7/8	16 3/8	16 7/8	16 7/8	16 7/8	16 3/8	16 3/8	16½	16½
No. 2 Ribbed Smoked Sheet	16¼	16 7/8	16 7/8	16 3/8	16 3/8	16 7/8	16 7/8	16 7/8	16¼	16 7/8	16 7/8	..	..	16 7/8	16 7/8	16 3/8	16 7/8	16 3/8	16 3/8	16 3/8	16 7/8	16 7/8	16 7/8	16 7/8
No. 3 Ribbed Smoked Sheet	16 7/8	16 3/8	16 3/8	16 7/8	16 7/8	16 3/8	16 3/8	16¼	16 7/8	16¼	16 3/8	..	..	16 3/8	16 3/8	16 7/8	16¼	16 7/8	16 7/8	16¼	16¼	16 3/8	16 3/8	16 3/8
No. 4 Ribbed Smoked Sheet	16 7/8	16 3/8	16 3/8	16 7/8	16 7/8	16 3/8	16 3/8	16¼	16 7/8	16¼	16 3/8	..	..	16 3/8	16 3/8	16 7/8	16¼	16 7/8	16 7/8	16 7/8	16¼	16¼	16 3/8	16 3/8
No. 1 Thin Latex Crepe	16 15/16	17⅛	17⅛	17 7/8	17 7/8	17⅛	17⅛	17	16 15/16	17	17⅛	..	..	17⅛	17⅛	17⅛	17 7/8	17⅛	17⅛	17 7/8	17 7/8	17 7/8	17 7/8	17 7/8
No. 1 Thick Latex Crepe	16 15/16	17⅛	17⅛	17 7/8	17 7/8	17⅛	17⅛	17	16 15/16	17	17⅛	..	..	17⅛	17⅛	17⅛	17 7/8	17⅛	17⅛	17 7/8	17 7/8	17 7/8	17 7/8	17 7/8
No. 1 Brown Crepe	16¼	16 7/8	16 7/8	16 3/8	16 3/8	16 7/8	16 7/8	16 7/8	16¼	16 7/8	16 7/8	..	..	16 7/8	16 7/8	16 3/8	16 7/8	16 3/8	16 3/8	16 3/8	16 7/8	16 7/8	16 7/8	16 7/8
No. 2 Brown Crepe	16 7/8	16 3/8	16 3/8	16 7/8	16 7/8	16 3/8	16 3/8	16¼	16 7/8	16¼	16 3/8	..	..	16 3/8	16 3/8	16 7/8	16¼	16 7/8	16 7/8	16 7/8	16¼	16¼	16 3/8	16 3/8
No. 2 Amber	16¼	16 7/8	16 7/8	16 3/8	16 3/8	16 7/8	16 7/8	16 7/8	16¼	16 7/8	16 7/8	..	..	16 7/8	16 7/8	16 3/8	16 7/8	16 3/8	16 3/8	16 3/8	16 7/8	16 7/8	16 7/8	16 7/8
No. 3 Amber	16 7/8	16 3/8	16 3/8	16 7/8	16 7/8	16 3/8	16 3/8	16¼	16 7/8	16¼	16 3/8	..	..	16 3/8	16 3/8	16 7/8	16¼	16 7/8	16 7/8	16¼	16¼	16 3/8	16 3/8	16 3/8
No. 4 Amber	16 7/8	16¼	16¼	16 7/8	16 7/8	16¼	16¼	16½	16 7/8	16½	16¼	..	..	16¼	16¼	16 7/8	16½	16 7/8	16 7/8	16½	16½	16½	16¼	16¼
Rolled Brown	15 15/16	16	16	15 15/16	15 15/16	16	16	15 7/8	15 15/16	15 7/8	16	..	..	16	16	15 15/16	15 7/8	15 15/16	15 15/16	15 15/16	15 7/8	15 7/8	16	16

* Closed. † Holiday.

RECLAIMED RUBBER

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption % to Crude	U. S. Stocks*	Exports
1934	110,010	100,597	22.3	23,079	4,737
1935	122,140	113,530	22.9	25,069	5,383
1936					
January	11,665	10,039	20.7	26,145	572
February	10,188	7,366	20.0	28,267	455
March	10,712	8,767	20.5	29,161	591
April	11,382	10,333	19.9	22,274	589
May	11,512	10,396	20.6	22,852	635
June	11,935	11,548	21.9	22,738	596
July	12,330	11,816	24.6	22,602	633
August	12,856	10,993	23.6	23,750	617
September	12,959	11,170	24.1	24,950	...

*Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.

PRODUCTION output reported for September shows a small increase over that for August. The percentage of consumption of reclaim to crude rubber also is gaining slowly and for September amounts to 24.1%. Reclaimers are very busy maintaining their output at capacity. The outlook indicates that demand for reclaims of all grades will continue strong throughout the fall and early winter because of renewed activity in the automotive and building industries and the extension of the field for reclaims developed by high grade specialties.

Quotations on all grades of reclaim but standard shoe have advanced.

New York Quotations
October 26, 1936

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	5⅜/ 5⅝
Acid	1.18-1.22	6¼/ 6½
Shoe		
Standard	1.56-1.60	6½/ 6¾
Tube		
No. 1 Floating	1.00	16 /16¼
Compounded	1.10-1.12	7¾/ 8
Red Tube	1.15-1.30	7¾/ 8¼
Miscellaneous		
Mechanical Blends	1.25-1.50	3¾/ 4½
White	1.35-1.50	11¼/11½

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

IMPORTS, CONSUMPTION, AND STOCKS

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Imports* Tons	U. S. Consumption Tons	U. S. Stocks Mfgrs., Importers, Dealers, Etc.† Tons	U. S. Stocks Afloat† Tons	U. K.—Public Warehouses, London, Liverpool† Tons	Singapore and Penang Dealers and Port Stocks†‡ Tons	World Production (Net) Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡§ Tons
1934	469,484	453,223	355,000	47,644	134,927	62,142	1,019,200	964,500	681,362
1935	448,116	491,544	303,000	39,094	164,295	28,304	872,722	931,278	586,282
1936									
January	31,292	48,506	285,054	43,870	162,107	31,195	62,720	66,138	566,852
February	35,219	36,746	282,902	46,532	157,028	38,421	64,019	60,030	569,550
March	37,451	42,703	276,823	58,935	147,712	29,322	69,252	61,478	548,721
April	40,365	51,897	264,228	47,678	140,404	32,200	60,030	70,763	524,655
May	35,600	50,482	248,317	48,860	130,590	26,687	68,837	64,602	499,116
June	41,802	52,636	245,886	47,228	122,285	28,260	66,478	62,273	490,933
July	35,847	48,127	234,498	60,343	113,386	29,443	83,889	67,571	488,023
August	42,563	46,657	229,056	63,597	108,215	28,289	71,093	.....	469,060
September	48,386	46,330	228,477	62,240	.....	.....	.....	.....	.....

* Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, and afloat.

CRUDE rubber consumption by United States manufacturers for September, 1936, is estimated at 46,330 long tons, compared with 46,657 long tons for August, less than 1% under August, but 24.9% above the September, 1935, revised figure of 37,086 long tons, according to R.M.A. statistics.

Crude rubber imports for September totaled 48,386 long tons, 13.7% over the August figure of 42,563 long tons and 40% over the 34,569 long tons imported in September, 1935.

The estimated total domestic stocks of crude rubber on hand September 30 were 228,477 long tons, against August 31 stocks of 229,056 long tons and 331,121 (revised) long tons on hand September 30, 1935.

Crude rubber afloat to United States ports on September 30 is estimated at 62,240 long tons, compared with 63,597 long tons afloat on August 31 and 43,413 long tons afloat on September 30, 1935.

London and Liverpool Stocks

Week Ended	Tons London	Tons Liverpool
Oct. 3	43,686	59,329
Oct. 10	42,554	58,063
Oct. 17	42,177	57,031
Oct. 24	41,367	56,363

RUBBER SCRAP

THE demand for scrap has continuously improved during the past two months and is rated very good by leading dealers. Consumption is heavy on all grades and exceptionally so on inner tubes. The increasing scrap movement from dealers' stocks into consuming channels reacts with stimulating effect on the activity of scrap collectors to maintain adequately the supply particularly of tires and tubes. The prospect that activity in the demand for the full line will continue to increase is taken for granted in conformity with the demand for supplies by industry as it regains full production in basic lines.

Prices on all grades of rubber scrap remain as yet unchanged from the quotations published one month ago.

CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)
October 26, 1936

		Prices
Boots and Shoes		
Boots and shoes, black	lb.	$0.01 /$0.01¼
Colored	lb.	.00¾/ .01¼
Untrimmed arctics	lb.	.00¾/ .01¼
Inner Tubes		
No. 1, floating	lb.	.11 / .11½
No. 2, compound	lb.	.04¼/ .04½
Red	lb.	.04¼/ .04½
Mixed tubes	lb.	.04⅛/ .04¼
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	9.25 / 9.50
Beadless	ton	13.00 /13.50
Auto tire carcass	ton	16.00 /17.00
Black auto peelings	ton	15.00 /16.00
Solid		
Clean mixed truck	ton	31.50 /33.00
Light gravity	ton	36.00 /37.00
Mechanicals		
Mixed black scrap	ton	14.50 /15.00
Hose, air brake	ton	18.00 /20.00
Garden, rubber covered	ton	14.00 /15.00
Steam and water, soft	ton	14.00 /15.00
No. 1 red	lb.	.03 / .03¼
No. 2 red	lb.	.02¾/ .03
White druggists' sundries	lb.	.04½/ .05
Mechanical	lb.	.03¾/ .04
Hard Rubber		
No. 1 hard rubber	lb.	.12 / .12½

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	Commodity	City and Country
	Export Opportunities	
†1,616	Tire patch outfits	Bogota, Colombia
‡1,640	Bicycle tires	Kongolo, Belgian Congo
‡1,694	Rubber-tired toy automobiles	Melbourne, Australia
‡1,720	Green grooved tubing.	Prague, Czechoslovakia
‡1,730	Garden hose	Santiago, Chile
*1,736	Round rubber yarn	Zabreh, Czechoslovakia
*1,754	Tubing, garden hose, floor tiles, chair foot cups, etc.	Medan, Sumatra
	Import Opportunities	
§115	Balata, etc.	Medellin, Colombia

*Purchase. †Agency. ‡Purchase and agency. §Sale.

COMPOUNDING INGREDIENTS

CARBON BLACK. The growing appreciation of carbon black as a rubber compounding ingredient is shown by its typical increase in sales thus far this year. For example, one of the leading producers states that demand thus far indicates that its sales for 1936 will total about 25% ahead of 1935. The same company is now building two new units which will be in production about January first. These added facilities will increase its plant capacity by 50% to meet the expected increase of sales for 1937.

FACTICE. The steady advances in the prices of vegetable oil have caused the quotations on factice and rubber substitute to rise correspondingly. Seasonable business is expected for the remainder of the year.

LITHARGE. Demand is routine. Prices have remained unchanged for several months.

LITHOPONE. Demand against contracts has improved. Prices continue unchanged.

RUBBER CHEMICALS. Demand is reported excellent. Prices are firm and unchanged from those of a month ago.

RUBBER COLORS. The market on chromium oxides has for some time been in a disturbed condition due to a bad competitive situation existing between two of the producers. This led to most of the standards being offered below cost. This sales policy resulted in losses that one or other of the contending producers was unwilling to sustain any longer. The affected grades have now been advanced as much as 1¼¢ a pound.

RUBBER SOLVENTS. Active demand is being well maintained at unchanged price levels.

STEARIC ACID. This material is in fairly active demand at steady prices. Other fatty acid products are up.

TITANIUM PIGMENTS. The demand for titanium pigments by the rubber industry was comparatively slack in September because it was off season for white goods in footwear, etc. Sales, however, showed improvement over September of last year and indicate a growing demand for titanium pigment in the white footwear season of next year.

A new schedule of prices starts November 1.

ZINC OXIDE. An increase of ¼¢ per pound became effective October 1. Previous to and immediately following that date the demand was distinctly stimulated, but fell off during the remainder of the month. Producers consider that even at the advance the relative prices for zinc oxide are too low for profit; yet it appears questional whether prices will be advanced again for the first quarter of 1937.

New York Quotations

October 26, 1936

Prices Not Reported Will Be Supplied on Application

Abrasives		
Pumicestone, powdered	lb.	$0.02½/$0.03½
Rottenstone, domestic	lb.	.03 / .03½
Silica, 15	ton	38.00
Accelerators, Inorganic		
Lime, hydrated	ton	20.00
Litharge (commercial)	lb.	.07
Accelerators, Organic		
A-1	lb.	.24 / .28
A-5-10	lb.	.33 / .36
A-10	lb.	
A-11	lb.	.60 / .75
A-16	lb.	.55 / .65
A-19	lb.	.56 / .75
A-32	lb.	.70 / .80
A-77	lb.	.46 / .55
Accelerator 49	lb.	
808	lb.	
833	lb.	
Acrin	lb.	
Aldehyde ammonia	lb.	
Altax	lb.	
Beutene	lb.	
Butyl Zimate	lb.	
C-P-B	lb.	
Captax	lb.	
Crylene	lb.	
Paste	lb.	
D-B-A	lb.	
Di-Esterex	lb.	
Di-Esterex-N	lb.	
DOTG	lb.	
D.O.T.T.U.	lb.	
DPG	lb.	.55 / .65
El-Sixty	lb.	
Ethylideneaniline	lb.	
Formaldehyde P.A.C.	lb.	
Formaldehydeaniline	lb.	
Formaldehyde-para-toluidine	lb.	
Guantal	lb.	.42 / .51
Hepteen	lb.	
Base	lb.	
Hexamethylenetetramine	lb.	
Lead oleate, No. 999	lb.	.115
Witco	lb.	.11
Methylenedianilide	lb.	
Monex	lb.	
Novex	lb.	
O. N. V.	lb.	
Ovac	lb.	
Pipsolene	lb.	1.60 / 1.85
R-2	lb.	1.50 / 1.80
Base	lb.	3.30 / 3.75
R & H 50-D	lb.	
Safex	lb.	
Super-sulphur No. 1	lb.	
No. 2	lb.	
Tetrone A	lb.	
Thiocarbanilide	lb.	
Thionex	lb.	
Trimene	lb.	
Base	lb.	
Triphenyl guanidine (TPG)	lb.	
Tuads	lb.	
Ureka	lb.	.62 / 1.00
Blend B	lb.	.62 / .75
C	lb.	.58 / .69
Vulcanex	lb.	
Vulcanol	lb.	
Vulcone	lb.	
Z-B-X	lb.	
Z-88-P	lb.	$0.48 /$0.60
Zenite	lb.	
A	lb.	
B	lb.	
Zimate	lb.	
ZML	lb.	
Activator		
Barak	lb.	
Age Resisters		
AgeRite Alba	lb.	
Exel	lb.	
Gel	lb.	
Hipar	lb.	
HP	lb.	
Powder	lb.	
Resin	lb.	
D	lb.	
Syrup	lb.	
White	lb.	
Akroflex C	lb.	
Albasan	lb.	
Antox	lb.	
B-L-E	lb.	
B-X-A	lb.	
Copper Inhibitor X-872	lb.	
Flectol B	lb.	.54 / .65
H	lb.	.54 / .65
White	lb.	.95 / 1.15
M-U-F	lb.	
Neozone (standard)	lb.	
A	lb.	
C	lb.	
D	lb.	
E	lb.	
Oxynone	lb.	.66 / .75
Parazone	lb.	
Perflectol	lb.	.67 / .75
Permalux	lb.	
Solux	lb.	
Thermoflex	lb.	
A	lb.	
V-G-B	lb.	
Alkalies		
Caustic soda, flake, Columbia (400 lb. drums)	100 lbs.	3.00 / 4.00
liquid, 50%	100 lbs.	2.25
solid (700 lb. drums)	100 lbs.	2.60 / 3.00
Antiscorch Materials		
Antiscorch T	lb.	
Cumar RH	lb.	.09
Retarder B	lb.	
W	lb.	
T-J-B	lb.	
U.T.B.	lb.	
Antisun Materials		
Heliozone	lb.	
Sunproof	lb.	
Brake Lining Saturant		
B. R. T. No. 3	lb.	.016 / .018
Colors		
BLACK		
Lampblack (commercial)	lb.	$0.15
BLUE		
Brilliant	lb.	
Prussian	lb.	
Toners	lb.	.80 /$3.50
BROWN		
Mapico	lb.	.13
GREEN		
Brilliant	lb.	
Chrome, light	lb.	
medium	lb.	
oxide	lb.	.18½
Dark	lb.	
Guignet's	lb.	.70
Light	lb.	
Toners	lb.	.85 / 3.50
ORANGE		
Lake	lb.	
Toners	lb.	.40 / 1.60
ORCHID		
Toners	lb.	1.50 / 2.00
PINK		
Toners	lb.	1.50 / 4.00
PURPLE		
Permanent	lb.	
Toners	lb.	.60 / 2.00
RED		
Antimony		
Crimson, 15/17%	lb.	
R. M. P. No. 3	lb.	.46
Sulphur free	lb.	.48
Golden 15/17%	lb.	
7-A	lb.	.35
Z-2	lb.	.22
Aristi	lb.	
Cadmium, light (400 lb. bbls.)	lb.	.70
Chinese	lb.	
Crimson	lb.	
Mapico	lb.	.09¼
Medium	lb.	
Rub-Er-Red	lb.	.09¼
Scarlet	lb.	
Toners	lb.	.80 / 2.00
WHITE		
Lithopone (bags)	lb.	.04½/ .04¾
Albalith Black Label-11	lb.	.04½/ .04¾
Astrolith (5-ton lots)	lb.	.04½
Azolith	lb.	.04½/ .04¾
Cryptone-19	lb.	.06 / .06¼
CB-21	lb.	.06 / .06¼
ZS No. 20	lb.	
No. 86	lb.	
Sunolith (5-ton lots)	lb.	.04½
Ray-Bar	lb.	
Ray-Cal	lb.	
Rayox	lb.	
Titanolith (5-ton lots)	lb.	.06
Titanox-A (50-lb. bags)	lb.	.17 / .18½
B (50-lb. bags)	lb.	.06 / .06¼
B-30 (50-lb. bags)	lb.	.06 / .06¼
C (50-lb. bags)	lb.	.06 / .06¼

Ti-Tone	lb.	
Zinc Oxide		
Anaconda, Green Seal		
No. 333	lb.	$0.06¼/$0.06½
Lead Free No. 352	lb.	.05¼/ .05½
No. 570	lb.	.05¼/ .05½
No. 577	lb.	.05¼/ .05½
Red Seal No. 222	lb.	.05¾/ .06
U.S.P. No. 777 (bbls.)	lb.	.08
White Seal No. 555	lb.	.06¾/ .07
Azo ZZZ-11	lb.	.05¼/ .05½
44	lb.	.05¼/ .05½
55	lb.	.05¼/ .05½
66	lb.	.05¼/ .05½
French Process, Florence		
White Seal-7 (bbls.)	lb.	.06¾/ .07
Green Seal-8	lb.	.06¼/ .06½
Red Seal-9	lb.	.05¾/ .06
Kadox, Black Label-15	lb.	.05¼/ .05½
Blue Label-16	lb.	.05¼/ .05½
Red Label-17	lb.	.05¼/ .05½
Horse Head Special 3	lb.	.05¼/ .05½
XX Red-4	lb.	.05¼/ .05½
23	lb.	.05¼/ .05½
72	lb.	.05¼/ .05½
78	lb.	.05¼/ .05½
80	lb.	.05¼/ .05½
103	lb.	.05¼/ .05½
110	lb.	.05¼/ .05½
St. Joe (lead free)		
Black Label No. 20	lb.	.05¼/ .05½
Green Label No. 42	lb.	.05¼/ .05½
Red Label No. 30	lb.	.05¼/ .05½
U.S.P. X	lb.	.08 / .08¼
White Jack	lb.	.10½/ .11½
YELLOW		
Cadmolith (cadmium yellow), 400 lb. bbls.	lb.	.45
Lemon	lb.	
Mapico	lb.	.09½
Toners	lb.	2.50
Dispersing Agents		
Bardol	lb.	.021 / .023
Darvan	lb.	
Factice		
Amberex	lb.	.26
Brown	lb.	.08 / .13
Duphax A	lb.	.12
B	lb.	.12
Fac-Cel B	lb.	.145
C	lb.	.145
White	lb.	.09 / .14
Fillers, Inert		
Asbestine, c.l., f.o.b. mills	ton	15.00
Barytes	ton	30.00
f.o.b. St. Louis (50 lb. paper bags)	ton	22.85
off color, domestic	ton	20.00 /25.00
white, imported	ton	29.00 /32.00
Blanc fixe, dry, precip	lb.	.03½/ .05
Calcene	ton	37.50 /45.00
Infusorial earth	lb.	.02 / .03
Kalite No. 1	ton	
No. 3	ton	
Magnesia, calcined, heavy	lb.	.04
carbonate	lb.	.06½/ .07
Whiting		
Columbia Filler	ton	9.00 /14.00
Domestic	100 lbs.	
Guilders	100 lbs.	
Hakuenka	lb.	
Paris white, English cliff-stone	100 lbs.	
Southwark Brand, Commercial	100 lbs.	
All other grades	100 lbs.	
Suprex, white extra light	ton	45.40 /60.00
heavy	ton	45.40 /60.00
Witco, c.l.	ton	7.00
Fillers for Pliability		
P-33	lb.	
Thermax	lb.	
Velvetex	lb.	.03 / .04½
Finishes		
IVCO lacquer, clear	gal.	1.00 / 2.25
colors	gal.	2.85 / 3.25
Rubber lacquer, clear	gal.	
colored	gal.	
Starch, corn, pwd	100 lbs.	
potato	lb.	
Talc	ton	25.00 /45.00
Pyrax	ton	
Flock		
Cotton flock, dark	lb.	.11½/ .14
dyed	lb.	.50
white	lb.	.14½/ .20
Rayon flock, colored	lb.	1.25 / 1.60
white	lb.	1.10
Latex Compounding Ingredients		
Accelerator 85	lb.	
89	lb.	
122	lb.	
552	lb.	
Alphasol-OS	lb.	
Antox, Dispersed	lb.	
Aquarex A	lb.	
D	lb.	
F	lb.	
Aresklene 375	lb.	.35 / .50
Black No. 25, Dispersed	lb.	.22 / .40
Catalpo	ton	
Color Pastes, Dispersed	lb.	
Dispersex No. 15	lb.	$0.80 /$0.95
No. 20	lb.	.60 / .75
Emo, brown	lb.	.13
white	lb.	.13
Factice Compound, Dispersed	lb.	.30
Heliozone, Dispersed	lb.	
Igepon A	lb.	
MICRONEX, Colloidal	lb.	.06 / .07
Nekal BX (dry)	lb.	
Palmol	lb.	.10
Paradors	lb.	
Stablex A	lb.	1.75
B	lb.	.90
C	lb.	.30
Sulphur, Dispersed	lb.	.10 / .15
No. 2	lb.	
T.1. (400 lb. drums)	lb.	.40
Tepidone	lb.	
Vulcan Colors	lb.	
Zinc oxide, Colloidal	lb.	
Dispersed	lb.	.09 / .15
Mineral Rubber		
B. R. C. No. 20	lb.	.0125/ .014
Black Diamond	ton	25.00
Genasco Hydrocarbon, granulated, (fact'y)	ton	
solid	ton	
Gilsonite Hydrocarbon (factory)	ton	
Hydrocarbon, hard	ton	
soft	ton	
Parmr Grade 1	ton	25.00
Grade 2	ton	25.00
Pioneer	ton	
265°	ton	
Mold Lubricants		
Mold Paste	lb.	.12 / .30
Sericite	ton	65.00 /75.00
Soapbark	lb.	
Soapstone	ton	25.00 /35.00
Oil Resistant		
AXF	lb.	
Reclaiming Oils		
B. R. V.	lb.	.039 / .041
S. R. O.	lb.	.015 / .019
Reenforcers		
Carbon Black		
Aerfloted Arrow Specification Black	lb.	.0535/ .0825
Arrow Compact Granulized Carbon Black	lb.	
"Certified" Heavy Compressed, Cabot	lb.	
Spheron	lb.	
Disperso (delivered)	lb.	.0445/ .0535
Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445
c.l., delivered New York	lb.	.0535
local stock delivered	lb.	.07 / .08¼
Dixiedensed, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445
c.l., delivered New York	lb.	.0535
local stock delivered	lb.	.07 / .08¼
Dixiedensed 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445
c.l., delivered New York	lb.	.0535
local stock delivered	lb.	.07 / .08¼
Excello, c.l., f.o.b. Gulf ports	lb.	.0445/ .0645
delivered New York	lb.	.0535/ .0735
l.c.l., delivered New York	lb.	.07 / .08¼
Fumonex, c.l., f.o.b. works	lb.	.03
ex-warehouse	lb.	.04½
Gastex	lb.	.03 / .07
Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445
c.l., delivered New York	lb.	.0535
local stock delivered	lb.	.07 / .08¼
Kosmobile 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445
c.l., delivered New York	lb.	.0535
local stock, delivered	lb.	.07 / .08¼
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445
c.l., delivered New York	lb.	.0535
local stock delivered	lb.	.07 / .08¼
MICRONEX Beads, c.l., f.o.b. Gulf ports	lb.	.0445
c.l., delivered New York	lb.	.0535
local stock, l.c.l., delivered	lb.	.07 / .08¼
Mark II, c.l., f.o.b. Gulf ports	lb.	.0445
c.l., delivered New York	lb.	.0535
local stock, l.c.l., delivered	lb.	.07 / .08¼
Standard, c.l., f.o.b. Gulf ports	lb.	.0445
c.l., delivered New York	lb.	.0535
local stock, l.c.l., delivered	lb.	.07 / .08¼
W-5, c.l., f.o.b., Gulf ports	lb.	$0.0445
c.l., delivered New York	lb.	.0535
local stock, l.c.l., delivered	lb.	.07 /$0.08¼
W-6, c.l., f.o.b., Gulf ports	lb.	.0445
c.l., delivered New York	lb.	.0535
local stock, l.c.l., delivered	lb.	.07 / .08¼
Pelletex	lb.	.03 / .07
Supreme, c.l., f.o.b. Gulf ports	lb.	.0445/ .0645
delivered New York	lb.	.0535/ .0735
l.c.l., delivered New York	lb.	.07 / .08¼
"WYEX BLACK"	lb.	
Carbonex	lb.	.03 / .0375
Carbonex "S"	lb.	.0315/ .04
Clays		
Aerfloted Paragon	ton	8.50
Suprex No. 1 Selected	ton	10.00
No. 2 Standard	ton	8.50
China	ton	
Dixie	ton	
Junior	ton	
McNamee	ton	
Par	ton	
Witco	ton	8.50
Cumar EX	lb.	.04
Reodorants		
Amora A	lb.	
B	lb.	
C	lb.	
D	lb.	
Paradors	lb.	
Rodo No. 0	lb.	
No. 10	lb.	
Rubber Substitutes		
Black	lb.	.07 / .11
Brown	lb.	.08 / .14
White	lb.	.08½/ .14
Softeners		
Burgundy pitch	lb.	.05
Cycline oil	gal.	.15 / .28
Palm oil (Witco)	lb.	.05½
Petrolatum, amber (f.o.b. refinery, Warren, Pa.)	lb.	.02½/ .03¼
light amber	lb.	.02¾/ .03½
Pine tar	gal.	
Plastogen	lb.	
Reogen	lb.	
Rosin oil, compounded	gal.	.40
RPA No. 1	lb.	
Rubtack	lb.	.10
Tackol	lb.	.085 / .18
Tonox	lb.	
Powder	lb.	
Witco No. 20	gal.	.15
Softeners for Hard Rubber Compounding		
RSL Resin	lb.	.25 / .35
Resin C Pitch 55° C. M.P.	lb.	.0125/ .0145
Resin C Pitch 70° C. M.P.	lb.	.0125/ .0145
Resin C Pitch 85° C. M.P.	lb.	.0125/ .0145
Solvents		
Beta-Trichlorethane	gal.	
Bondogen	lb.	
Carbon bisulphide	lb.	
tetrachloride	lb.	
Stabilizers for Cure		
Laurex, ton lots	lb.	
Stearex B	lb.	.095 / .105
Beads	lb.	.093 / .101
Stearic acid, single pressed	lb.	.095 / .105
Stearite	100 lbs.	9.30 /10.10
Zinc stearate	lb.	.22
Synthetic Rubber		
"DuPrene"[1] Latex Type 50	lb.	
53	lb.	
54	lb.	
Type E	lb.	
"Thiokol" A (f.o.b. Yardville)	lb.	.35
Coating Materials	gal.	3.00 / 5.00
D	lb.	.65
Molding Powder	lb.	.55 / .70
Tackifier		
B. R. H. No. 2	lb.	.014 / .020
Varnish		
Shoe	gal.	1.45
Vulcanizing Ingredients		
Sulphur		
Chloride, drums	lb.	.03½/ .04
Rubber	100 lbs.	
Telloy	lb.	
Vandex	lb.	
(See also Colors—Antimony)		
Waxes		
Carnauba, No. 3 chalky	lb.	
2 N.C.	lb.	
3 N.C.	lb.	
1 Yellow	lb.	
2	lb.	
Montan, crude	lb.	

[1] Trade mark registered.

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Aug. 29	Sept. 26	Oct. 3	Oct. 10	Oct. 17	Oct. 24
Sept.	11.43	.....	.....	.....	.....	.....
Oct.	11.30	11.94	12.05	11.88	.....	.....
Dec.	11.36	11.88	11.99	11.76	11.97	11.68
Mar.	11.45	11.84	11.96	11.80	12.06	11.78
July	11.51	11.74	11.80	11.76	12.03	11.79
Sept.	.....	.....	.....	.....	11.73	11.49

New York Quotations

October 26, 1936

Drills		
38-inch 2.00-yard	yd.	$0.14½
40-inch 3.47-yard		.09
50-inch 1.52-yard		.19¾
52-inch 1.85-yard		.16½
52-inch 1.90-yard		.15¾
52-inch 2.20-yard		.14¼
52-inch 2.50-yard		.12¾
59-inch 1.85-yard		.16
Ducks		
38-inch 2.00 yard D. F.	yd.	$0.14½/.14¾
40-inch 1.45-yard S. F.		.20⅜
51½-inch 1.35-yard D. F.		.20¾
72-inch 1.05-yard D. F.	.29	/.29½
72-inch 17.21-ounce		.32½
MECHANICALS		
Hose and belting	lb.	.28½
TENNIS		
52-inch 1.35-yard	yd.	.21⅞
***Hollands**		
GOLD SEAL		
20-inch No. 72	yd.	.09
30-inch No. 72		.17¼
40-inch No. 72		.18
RED SEAL		
20-inch	yd.	.08¼
30-inch		.15¾
40-inch		.16½
50-inch		.21
Osnaburgs		
40-inch 2.34-yard	yd.	.11⅜/.12⅜
40-inch 2.48-yard		.10¾/.11¾
40-inch 2.56-yard		.10⅜
40-inch 3.00-yard		.09⅜
40-inch 7-ounce part waste		.10¼
40-inch 10-ounce part waste		.14⅜
37-inch 2.42-yard		.12
Raincoat Fabrics		
COTTON		
Bombazine 60 x 64	yd.	.10
Plaids 60 x 48		.12
Surface prints 60 x 64		.13
Print cloth, 38½-inch, 60 x 64		.07¾
SHEETINGS, 40-INCH		
48 x 48, 2.50-yard	yd.	.10
64 x 68, 3.15-yard		.09⅜
56 x 60, 3.60-yard		.08⅜
44 x 40, 4.25-yard		.06½
SHEETINGS, 36-INCH		
48 x 48, 5.00-yard	yd.	.06¾
44 x 40, 6.15-yard		.04⅞
Tire Fabrics		
BUILDER		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.32
CHAFER		
14 ounce 60" 20/8 ply Karded peeler	lb.	.30
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.31
CORD FABRICS		
23/5/3 Karded peeler, 1/16" cotton	lb.	.31
15/3/3 Karded peeler, 1/16" cotton	lb.	.29
23/5/3 Karded peeler, 1¼" cotton	lb.	.35
23/5/3 Combed Egyptian	lb.	.47
LENO BREAKER		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.31

*For less than 1,000 yards of a width add 10% to given prices.

THE accompanying table gives the general trend of representative cotton futures for approximately the last two months. Spot middlings at 12.34¢ on September 26 made sharp advances, reaching 12.53¢ on October 2, from which level it declined steadily to 12.12¢ on October 8.

The revised estimate of this year's cotton production issued October 8 by the Crop Reporting Board of the Department of Agriculture places the output at 11,609,000 bales of 500 pounds each, an increase of 488,000 bales from the estimate of 11,121,000 issued September 8 and a reduction of 872,000 bales from the estimate of 12,481,000 bales issued August 8.

According to the New York Cotton Exchange Service statistics issued September 22, consumption of all growths of cotton by the mills of the world during the 1935-36 cotton season, which ended July 31, totaled 27,729,000 bales of 478 pounds net weight each. The exchange service figures placed production of all cottons last season at 26,262,000 bales and the carryover of all cottons at the end of the season at 13,073,000 bales. Both these figures and the consumption figure also show substantial increases over preliminary estimates. While consumption set a new record, production fell short of the previous record season of 1926-27 when 27,970,000 bales were turned out. It was, however, close to the highest in other seasons.

The exchange service comments as follows:

"In considering the revised statistics for last season two facts may be observed. First, even though the world did not know that production and consumption of all cottons were as large as the final statistics now disclose, the fact is that all of this extraordinary volume of cotton was there and was being distributed and consumed and presumably world markets were adjusted to that supply and distribution situation. Secondly, it may be considered that it is necessary to reappraise the world cotton situation in the light of the disclosure that, while the world produced a total of 26,262,000 bales last season, consisting of 10,495,000 bales of American cotton and 15,767,000 bales of foreign growths, it consumed a total of 27,729,000 bales, consisting of 12,530,000 bales of American cotton and 15,190,000 bales of foreign growths. If world consumption should continue on the basis of 27,729,000 bales during this season the world supply would be reduced unless the world produced that amount. With the American crop estimated at about 11,100,000 bales this would require a foreign crop of about 16,700,000 bales."

Fabrics

Since September fabrics have continued a gradual price advance. Demand is well maintained from excellent sources. The trade is of sound type and character with promise of carrying cloth gradually to higher price levels. Production is well under engagement for the balance of 1936. January-February production on specialty fabrics is for most part similarly under contract engagement. Cloth prices do not yet afford producers the margins warranted by their mill investment and current producing costs. Fall business in children's raincoat garments has far exceeded expectations but that for women's and men's wear has not reached to volume expected. Some concerns are now making fabric selections for new Spring lines.

Statement of "India Rubber World"

Statement of the ownership, management, circulation, etc., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of INDIA RUBBER WORLD, published monthly at New York, N. Y., for October 1, 1936.

State of New York } ss.
County of New York }

Before me, a notary public in and for the State and county aforesaid, personally appeared D. C. McRoberts, who, having been duly sworn according to law, deposes and says that he is the Editor of INDIA RUBBER WORLD and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: publisher, Bill Brothers Publishing Corp., 420 Lexington Ave., New York, N. Y.; editor, D. C. McRoberts, 420 Lexington Ave., New York, N. Y.; managing editor, D. C. McRoberts, 420 Lexington Ave., New York, N. Y.; business manager, B. Brittain Wilson, 420 Lexington Ave., New York, N. Y.

2. That the owner is: Bill Brothers Publishing Corp., Caroline L. Bill, Raymond Bill, Edward Lyman Bill, and Randolph Brown, all located at 420 Lexington Ave., New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1% or more of total amount of bonds, mortgages, or other securities are: None.

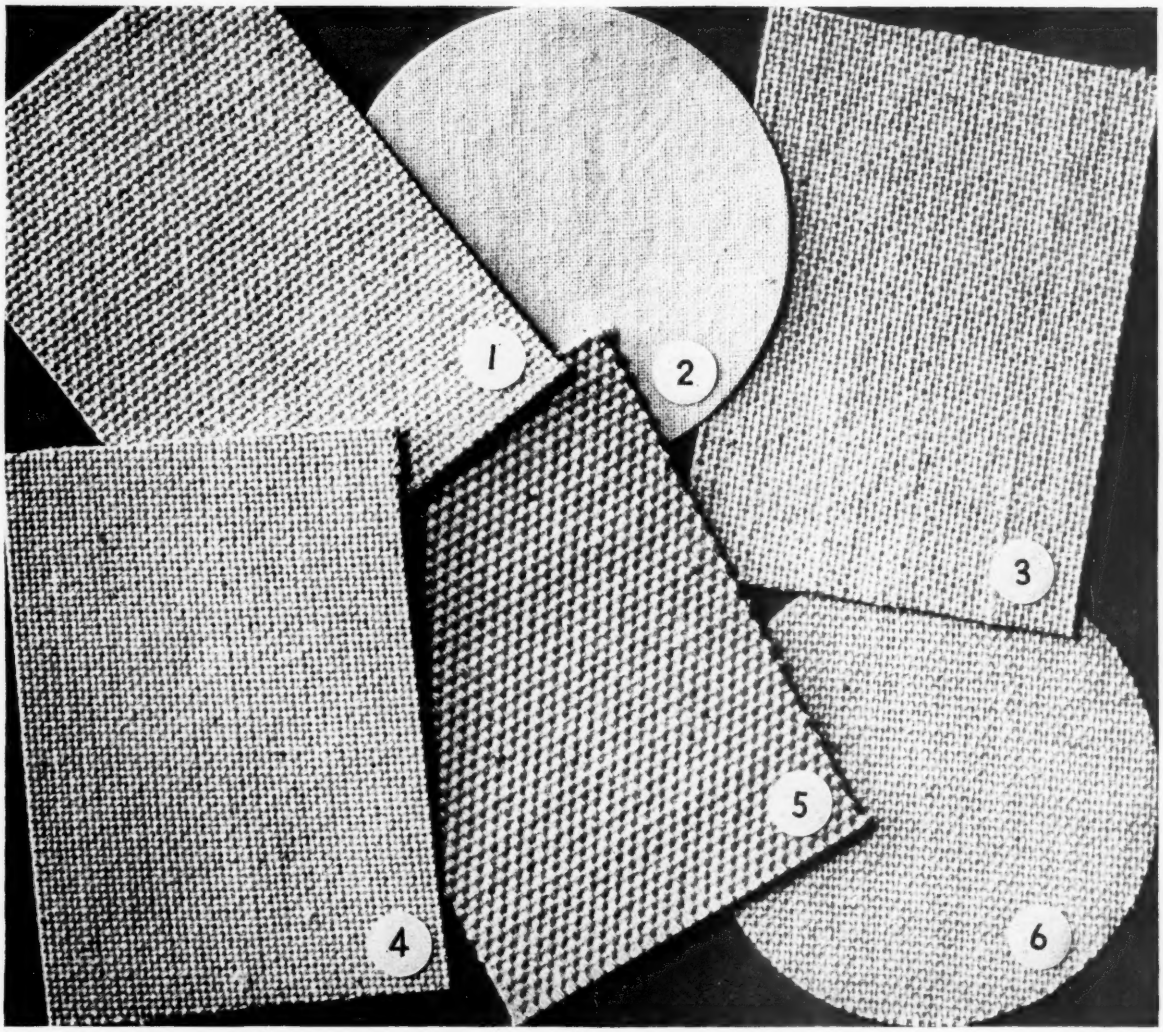
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

D. C. MCROBERTS,
Editor

Sworn to and subscribed before me this 28th day of September, 1936.

[SEAL] WM. A. LOW,
Notary Public Queens Co. No. 973. Reg. No. 5442. Certificate filed in N. Y. Co. No. 665, Reg. No. 7L382.

(Commission expires March 30, 1937)



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3. *WEST POINT Osnaburg*
4. *WEST POINT Chafer Fabric*
5. *SHAWMUT Belting Duck*
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WELLINGTON SEARS COMPANY

65 WORTH STREET NEW YORK

U. S. Crude and Waste Rubber Imports for 1936

	Planta-tions	Latex	Paras	Afri-cans	Cen-trals	Guay-ule	Manicoba and Matto Grosso	Totals 1936	Totals 1935	Ba-lata	Miscel-laneous	Waste
Jan. .....*tons*	29,130	1,263	597	167	65	70	..	31,292	42,059	20	870	122
Feb.	33,203	1,146	550	217	28	75	..	35,219	35,383	95	665	184
Mar.	35,675	1,296	390	35	15	40	..	37,451	44,041	60	620	142
Apr.	38,286	1,324	559	75	21	105	..	40,370	43,545	167	1,013	456
May	34,048	1,033	342	79	10	86	..	35,598	26,766	146	391	224
June	39,900	1,534	226	58	20	97	..	41,835	38,340	88	662	126
July	34,277	1,244	233	25	6	96	..	35,881	46,880	66	821	95
Aug.	40,742	1,486	50	126	12	146	..	42,562	38,655	142	523	155
Sept.	46,515	1,394	210	80	81	106	..	48,386	34,569	98	514	212
Total, 9 mos., 1936 .....*tons*	331,776	11,720	3,157	862	258	821	..	348,594	.....	882	6,079	1,716
Total, 9 mos., 1935 .....*tons*	337,213	8,092	3,867	595	154	317	..	.....	350,238	596	4,358	192

Compiled from The Rubber Manufacturers Association, Inc., statistics.

United States Latex Imports

Year	Pounds	Value
1934	29,276,134	$3,633,253
1935	30,358,748	3,782,222
1936		
Jan.	3,733,665	474,682
Feb.	3,268,542	406,985
Mar.	3,196,083	417,704
Apr.	3,610,511	522,049
May	3,296,351	490,769
June	4,250,178	657,311
July	3,729,418	579,895
Aug.	3,944,962	602,992

Data from Leather and Rubber Division, United States Department of Commerce, Washington, D. C.

Tire Production Statistics

	Pneumatic Casings—All Types: Inventory	Production	Total Shipments	Solid and Cushion Tires: Inventory	Production	Total Shipments
1934	9,454,985	47,232,748	46,686,545	34,710	197,497	187,152
1935	8,195,863	49,361,781	50,183,129	46,406	283,606	275,741
1936						
Jan.	8,916,673	4,578,179	3,874,523	40,193	25,443	22,670
Feb.	9,263,261	3,577,103	3,210,789	.....	14,730	17,172
Mar.	9,085,790	3,637,625	3,855,527	.....	16,004	21,350
Apr.	9,032,925	4,853,346	4,901,895	.....	32,807	32,611
May	8,174,806	4,970,388	5,831,641	.....	29,674	30,378
June	7,831,474	5,609,095	5,791,579	.....	36,856	35,617
July	7,746,388	5,464,927	5,743,863	.....	38,904	34,445
Aug.	7,793,438	5,014,415	4,976,383	.....	33,649	28,174

	Inner Tubes—All Types: Inventory	Production	Total Shipments
1934	9,179,893	46,227,807	45,045,495
1935	8,231,351	47,879,034	48,066,904
1936			
Jan.	8,622,522	4,591,791	4,167,711
Feb.	8,699,228	3,556,098	3,445,767
Mar.	8,691,651	3,787,226	3,795,505
Apr.	8,788,043	4,824,199	4,746,265
May	8,719,467	4,818,960	4,918,715
June	8,104,830	5,034,595	5,503,564
July	7,724,790	5,177,430	5,758,273
Aug.	7,620,573	5,038,785	5,136,005

Rubber Manufacturers Association, Inc., figures representing approximately 97% of the industry for 1934 and 1935, 81% for 1936, and 80% for previous years, with the exception of gasoline consumption.

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires: Cotton Fabric Pounds	Crude Rubber Pounds	Consumption of Motor Gasoline (100%) Gallons
1934...	196,069,495	697,558,218	17,063,298,000
1935...	202,318,119	756,773,779	18,167,352,000
1936			
Jan....	15,987,906	61,457,999	1,367,226,000
Feb....	12,059,051	45,839,772	1,150,842,000
Mar...	13,416,664	47,872,526	1,506,582,000
Apr....	16,570,836	64,211,819	1,630,650,000
May...	17,098,812	66,119,211	1,764,294,000
June..	18,494,366	69,251,427	1,874,460,000
July...	18,250,725	69,637,586	1,961,064,000
Aug...	17,151,577	64,998,596	1,935,402,000

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Trafalgar Sq., London, W.C.2, England, gives the following figures for September, 1936:

Rubber Exports: Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham

To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	2,889	399
United States	25,826	576
Continent of Europe..	4,565	362
British possessions ...	4,937	33
Japan	3,523	40
Other countries	953	7
Totals	42,693	1,417

Rubber Imports: Actual, by Land and Sea

From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra	1,231	1,983
Dutch Borneo	1,669	...
Java and other Dutch islands.	128	2
Sarawak	1,487	...
British Borneo	183	7
Burma	31	...
Siam	2,034	1,026
French Indo-China	112	85
Other countries	58	3
Totals	6,933	3,106

World Net Imports of Crude Rubber

Year	U.S.A.	U.K.	Australia	Belgium	Canada	Czecho-slovakia	France	Germany	Italy	Japan	Russia	Rest of the World	Total
1934	439,100	158,500	9,600	9,100	28,400	11,000	50,400	59,300	21,400	69,900	47,300	60,500	964,500
1935	455,757	128,829	9,977	7,593	26,868	11,225	52,322	62,901	23,916	57,589	37,576	56,725	931,278
1936													
Jan.	33,260	4,573	1,260	760	1,758	767	6,770	5,545	1,500*	4,357	467	5,121	66,138
Feb.	33,789	1,271	735	779	1,900	344	6,288	5,257	1,000*	3,305	94	5,268	60,030
Mar.	33,743	1,227	819	1,033	1,809	410	4,342	4,568	1,000*	5,172	4,376	5,433	61,478
Apr.	44,949	2,097	969	1,097	1,079	603	4,261	5,497	1,500*	4,931	3,251	4,723	70,763
May	35,549	302	1,053	698	2,221	667	4,342	4,639	1,000*	5,531	4,220	4,380	64,602
June	35,901	1,493	1,693	579	2,042	323	4,860	5,698	1,500*	4,567	2,427	4,176	62,273
July	38,556	766	1,455	713	2,274	495	4,631	6,837	2,000*	5,126	1,733	4,517	67,571

* Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Philippines and Oceania Total	Philippines and Oceania	Africa	South America	Mexican Guayule	Grand Total
1934	467,400	379,400	79,100	6,500	6,300	11,100	17,700	17,700	19,600	1,004,800	1,400	3,500	9,100	400	1,019,200
1935	417,005	282,858	54,316	9,054	4,914	8,885	19,465	28,327	28,677	853,501	1,537*	5,031	12,194	459	872,722
1936															
Jan.	26,637	20,778	4,178	419	874	938	2,317	1,665	2,449	60,255	105	494	1,796	70	62,720
Feb.	19,692	27,991	3,664	871	511	529	2,107	3,663	2,894	61,922	225	620	1,177	75	64,019
Mar.	34,597	19,403	4,336	750	574	342	1,848	2,966	2,553	67,369	133	535	1,175	40	69,252
Apr.	21,667	25,255	3,172	413	817	869	2,053	1,596	2,416	58,258	92	533	1,044	103	60,030
May	34,108	22,121	2,560	632	485	517	2,354	2,077	2,281	67,135	103	493	1,018	88	68,837
June	25,115	26,401	3,766	673	553	461	1,386	3,737	2,733	64,825	153	456	947	97	66,478
July	34,214	33,911	3,773	1,048	323	1,035	1,399	3,734	2,738	82,175	155*	450*	1,013	96	83,889
Aug.	30,253	25,255	4,009	688	121	656	2,541	3,284	3,017	69,824	150*	450*	569	100*	71,093

*Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)
Allow nine words for keyed address.		*Replies forwarded without charge.*

SITUATIONS WANTED

MAN, SPECIALIZED IN THE MANUFACTURE OF RUBBER novelties, toys, dolls, balls, bulbs, blown, cored or solid work, desires connections with manufacturer interested. Address Box No. 726, care of INDIA RUBBER WORLD.

SUPERINTENDENT OR COMPOUNDER: TEN years' experience, chiefly mechanicals, surgeon's, electrician's, and household gloves, and hard rubber. Graduate chemist. Address Box No. 730, care of INDIA RUBBER WORLD.

RUBBER TECHNOLOGIST, EXECUTIVE TYPE, NOW EMPLOYED, desires position of responsibility in large or small plant. Years of practical experience in development, compounding, and production of mechanicals, tires, tubes, etc. Also practical knowledge of reclaiming. Address Box No. 729, care of INDIA RUBBER WORLD.

A LIVE EXECUTIVE AND SALES PRODUCER AVAILABLE

17 years' experience in the development and sales of rubber heels, soles, and fibre products for the shoe manufacturing and findings trade. Large trade following with sizable volume of personal business. If you desire increased sales on a profitable basis evidence of complete satisfaction with results will be furnished. Address Box No. 734, care of INDIA RUBBER WORLD.

BELT FOREMAN, WITH 14 YEARS' EXPERIENCE, IS OPEN FOR a position. Thoroughly practical in the production and development of all types of belting. Address Box No. 731, care of INDIA RUBBER WORLD.

GENERAL SUPERINTENDENT OR PRODUCTION MANAGER, 20 years' experience rubber adhesive plaster, surgical dressings, cotton processing, ligatures. Address Box No. 736, care of INDIA RUBBER WORLD.

WANTED: POSITION IN PRODUCTION OR DEvelopment. Experience: sheeting, clothing, heels, soles, wire, matting, tiling and chemist. Excellent record. East preferred. Moderate salary. Very confidential. Address Box No. 735, care of INDIA RUBBER WORLD.

SITUATIONS WANTED—Continued

CONSULTANT, RUBBER ADHESIVE AND MEDICATED PLASters, surgical dressings, cotton processing. Formulae new and improved. Address Box No. 737, care of INDIA RUBBER WORLD.

RUBBER COMPOUNDER, EXPERIENCED IN THE DEVELOPment, control, and factory supervision of footwear and mechanical compounds, seeks position with opportunity. Address Box No. 738, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

WANTED: YOUNG OR MIDDLE-AGED RUBBER CHEMIST WITH two or more years' experience in a rubber factory. Some knowledge of rubber heels, soles, slabs, cements preferred though not essential. Plant is located in the East. Good opportunity to advance rapidly to position of chief chemist. Give training, experience, and salary expected at start. Replies kept strictly confidential. Address Box No. 727, care of INDIA RUBBER WORLD.

NEW FOOTWEAR PLANT IN NEARBY FOREIGN COUNTRY desires the services of a man thoroughly experienced in all phases of modern tennis shoe manufacture. Reply promptly to Box No. 732, care of INDIA RUBBER WORLD.

FACTORY MANAGER, THOROUGHLY EXPERIENCED WITH modern compounding and production methods, manufacturing costs, etc., on molded rubber goods such as plumbing, electrical, and small sundry items. Modern plant located short distance from New York. State experience and qualifications in detail; and salary expected. All replies held in strict confidence. Address Box No. 739, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITY

FOR SALE OR RENT: RUBBER PLANT NEAR PHILADELPHIA fully equipped for operating, machinery, presses, calenders, new boiler, artesian well, etc.; 9,000 square feet in building. An opportunity. Wynne James, Jr., Doylestown, Pa.

(*Advertisements continued on page 87*)

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	July, 1936		Seven Months Ended July, 1936	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	85,519,283	$12,763,200	566,689,154	$78,042,185
Liquid latex	3,729,418	579,895	25,084,748	3,549,395
Jelutong or pontianak	1,245,217	106,676	9,023,319	842,740
Balata	99,593	15,314	825,894	134,337
Gutta percha	190,165	27,048	2,319,929	385,107
Guayule	215,000	18,168	1,274,500	107,629
Siak, scrap, reclaimed, etc.	1,173,404	32,080	8,143,925	185,616
Totals	92,172,080	$13,542,381	613,361,469	$83,247,009
Chicle, crude—*Free*	357,355	$76,135	4,916,213	$1,187,376
MANUFACTURED—*Dutiable*				
Rubber tires—*number*	685	$981	52,255	$309,758
Rubber boots, shoes, and overshoes—*pairs*	3,065	453	36,990	7,586
Rubber soled footwear with fabric uppers—*pairs*	92,405	20,649	682,878	147,861
Golf balls—*number*	37,080	6,224	421,746	67,666
Lawn tennis balls—*number*	16,000	1,393	383,347	38,164
Other rubber balls—*number*	434,303	9,678	3,422,792	105,706
Other rubber toys, except balls	91,090	15,108	696,162	83,552
Hard rubber combs—*number*	99,706	5,961	467,798	27,641
Other manufactures of hard rubber	.....	2,894	.....	16,639
Friction or insulating tape	57,195	2,790	198,071	9,945
Belts, hose, packing, and insulating material	.....	13,003	.....	128,462
Druggists' sundries of soft rubber	.....	4,864	.....	53,830
Inflatable swimming belts, floats, etc.—*number*	51,341	1,603	646,574	34,868
Other rubber and gutta percha manufactures	155,855	25,450	857,276	156,921
Totals	.....	$111,051	.....	$1,188,599

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	3,097,416	$510,075	20,058,767	$3,158,183
Balata	23,547	6,718	155,501	40,774
Gutta percha, rubber substitutes, and scrap	185	177	76,750	5,453
Rubber manufactures	.....	622	.....	9,987
Totals	.....	$517,592	.....	$3,214,397

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Reclaimed	1,418,176	$62,733	9,127,848	$416,006
Scrap	4,883,709	109,473	26,687,636	516,803
Cements—*gal.*	18,528	15,931	126,604	102,166
Rubberized automobile cloth—*sq. yd.*	61,869	27,010	310,614	142,677
Other rubberized piece goods and hospital sheeting—*sq. yd.*	78,175	35,942	712,211	284,282
Footwear				
Boots—*pairs*	5,159	10,350	45,595	101,543
Shoes—*pairs*	7,580	3,279	152,198	58,180
Canvas shoes with rubber soles—*pairs*	23,686	13,389	126,336	75,315
Soles—*doz. prs.*	1,865	3,720	14,962	26,615
Heels—*doz. prs.*	37,836	22,931	240,926	153,130
Soling and top lift sheets	26,156	6,167	230,726	46,817
Gloves and mittens—*doz. prs.*	4,429	10,683	35,024	79,376
Water bottles and fountain syringes—*number*	24,484	7,591	134,647	49,312
Other druggists' sundries	.....	41,561	.....	287,320
Gum rubber clothing—*doz.*	10,567	24,662	73,051	122,459
Balloons—*gross*	19,371	21,077	170,023	155,919
Toys and balls	.....	12,446	.....	50,314
Bathing caps—*doz.*	8,264	10,714	46,339	74,554
Bands	20,670	8,254	146,672	52,391
Erasers	37,536	21,015	221,840	129,128
Hard rubber goods				
Electrical hard rubber goods	.....	15,467	.....	116,780
Other hard rubber goods	.....	27,995	.....	146,840
Tires				
Truck and bus casings, *number*	16,529	304,829	105,070	1,981,171
Other automobile casings, *number*	55,448	517,494	414,543	3,735,597
Tubes, auto—*number*	58,066	73,860	381,429	578,481
Other casings and tubes, *number*	4,659	21,655	27,280	111,630
Solid tires for automobiles and motor trucks—*number*	410	8,972	3,056	81,213
Other solid tires	155,487	23,549	691,762	106,777
Tire sundries and repair materials	.....	52,481	.....	337,944
Rubber and friction tape	65,245	16,425	394,440	103,541
Belts and belting	194,744	106,844	1,501,126	793,379
Hose	374,122	141,415	2,827,950	1,009,647
Packing	100,140	50,052	846,566	360,107
Mats, matting, flooring, and tiling	137,674	18,748	864,141	115,387
Thread	41,510	24,860	540,027	324,093
Gutta percha manufactures	25,282	10,145	488,206	130,165
Other rubber manufactures	.....	81,157	.....	670,248
Totals	.....	$1,964,786	.....	$13,627,307

Rubber Goods Production Statistics

		1936	1935
TIRES AND TUBES*		July	July
Pneumatic casings			
Production	*thousands*	4,427	3,426
Shipments, total	*thousands*	4,653	5,284
Domestic	*thousands*	....	5,212
Stocks, end of month	*thousands*	....	8,584
Solid and cushion tires			
Production	*thousands*	....	22
Shipments, total	*thousands*	....	20
Domestic	*thousands*	....	20
Stocks, end of month	*thousands*	....	36
Inner tubes			
Production	*thousands*	4,194	3,153
Shipments, total	*thousands*	4,664	5,111
Domestic	*thousands*	....	5,053
Stocks, end of month	*thousands*	....	7,765
Raw material consumed			
Fabrics	*thous. of lbs.*	18,251	14,868
MISCELLANEOUS PRODUCTS			
Rubber bands, shipments	*thous. of lbs.*	238	220
Rubber-proofed fabrics, production, total	*thous. of yds.*	4,001	4,200
Auto fabrics	*thous. of yds.*	334	278
Raincoat fabrics	*thous. of yds.*	1,473	1,986
Rubber flooring, shipments	*thous. of sq. ft.*	483	325
Rubber and canvas footwear			
Production, total	*thous. of prs.*	4,571	3,147
Tennis	*thous. of prs.*	1,244	702
Waterproof	*thous. of prs.*	3,327	2,445
Shipments, total	*thous. of prs.*	5,431	3,737
Tennis	*thous. of prs.*	2,034	1,507
Waterproof	*thous. of prs.*	3,397	2,230
Shipments, domestic, total	*thous. of prs.*	5,407	3,667
Tennis	*thous. of prs.*	2,018	1,490
Waterproof	*thous. of prs.*	3,390	2,177
Stocks, total, end of month	*thous. of prs.*	17,962	18,767
Tennis	*thous. of prs.*	3,729	4,836
Waterproof	*thous. of prs.*	14,233	13,931

*Data for January to July, 1935, are estimated to represent approximately 97% of the industry; for August, September, October, November, and December, 1935, the coverage is estimated to be 81%.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

Imports by Customs Districts

	August, 1936 *Crude Rubber		August, 1935 *Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	7,544,549	$1,158,514	9,072,267	$1,037,840
St. Lawrence	4,488	651	230	21
New York	63,388,437	9,637,740	72,824,521	8,523,202
Philadelphia	2,365,786	348,749	484,665	57,425
Maryland	2,074,244	316,571	2,096,749	234,222
Georgia	1,026,785	156,884	.....	.....
Mobile	158,071	21,303	600,876	61,898
New Orleans	1,966,020	315,798	621,305	73,099
Los Angeles	14,900,343	1,973,883	6,310,798	676,945
San Francisco	325,263	47,696	649,600	76,882
Oregon	.....	.....	11,200	980
Hawaii	.....	.....	224	28
Ohio	34	7	250,158	46,945
Colorado	179,200	27,259	.....	.....
Totals	93,933,220	$14,005,055	92,922,593	$10,789,487

*Crude rubber including latex dry rubber content.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Boston Woven Hose & Rubber Co.	6% Pfd.	$3.00 s. a.	Dec. 15	Dec. 1
Boston Woven Hose & Rubber Co.	Com.	$2.00 special	Nov. 5	Oct. 26
Collyer Insulated Wire Co.	Com.	$0.25 inc.	Oct. 1	Sept. 26
Plymouth Rubber Co.	Pfd.	$1.75 q.	Oct. 15	Oct. 1

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	INQUIRY
2199	Manufacturer of rubber molds for statues and other plaster novelties.
2200	Manufacturer of a quart-size putty bulb.
2201	Manufacturer of forms for making latex balloons.
2202	Manufacturer of molded rubber toys.
2203	Manufacturer of automatic latex dipping machines.
2204	Manufacturer of rubber soles to be pasted on footwear.
2205	Reclaimer of scrap rubber.
2206	Manufacturer of white rubber gears.
2207	Supplier of cloth used to cover the mold when making sponge rubber products.
2208	Manufacturer of rubber latex pails.
2209	Information wanted on manufacturing balloons and other articles from latex.
2210	Manufacturer of inner tube transfer labels.
2211	Which firm softens smoked sheets to reduce the time of breaking down on the mill.
2212	Manufacturer of massage tips as used in electrical vibrators.
2213	Manufacturer of rubber cement that can be applied to sponge rubber in a dry coat form and that can adhere to wood, steel, tin, etc.